Ethiopia:
Food-Based Dietary Guidelines–2022

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Note for the Ethiopian FBDG (2022)

Ethiopia: Food-Baseed Dietary Guidelines (FBDG)–Volume 1

Ethiopia: Food Guide (booklet)–Volume 1A

Ethiopia: FBDG for pastoralist community–Volume 1B

Revision for the Ethiopia: FBDG will be made in five to seven years

March 2022

Contents

ABBREVIATIONS AND ACRONYMS

A4NH	CGIAR Research Program on Agriculture for Nutrition and Health
AGP	Agriculture Growth Program
ASF	Animal-source foods
BMI	Body mass index
CHD	Coronary heart disease
CSA	Central Statistics Authority
CVD	Cardiovascular disease
EFCS	Ethiopian Food Consumption Survey
EPHI	Ethiopian Public Health Institute
FAO	United Nations Food and Agriculture Organization
FBDGs	Food-Based Dietary Guidelines
F&V	Fruit(s) and vegetable(s)
g	Gram
IFPRI	International Food Policy Research Institute
IYCF	Infant and young children feeding
kcal	Kilocalorie
kg	Kilogram
m	Meter
M&E	Monitoring and evaluation
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoH	Ministry of Health
NCD(s)	Non-communicable disease(s)

NCDI	Non-communicable diseases and injuries
NGO(s)	Non-governmental organization(s)
NNTC	National Nutrition Technical Committee
NNSA	National Nutrition-Sensitive Agriculture
NSAS	Nutrition-Sensitive Agriculture Strategy
PSNP	Productive Safety Net Program
SBCC	Social and behaviour change communication
SSB	Sugar-sweetened beverage
T2DM	Type 2 diabetes (mellitus)
UN	United Nations
UNICEF	United Nations Children's Fund
TWG	Technical Working Group
WFP	World Food Programme
WUR	Wageningen University and Research
WHO	World Health Organization

FOREWORD BY THE ETHIOPIAN PUBLIC HEALTH INSTITUTE

While the causes of malnutrition are complex and multi-layered, diet remains one of the single most prominent causes influenced by various factors from individual to national food availability. Food-based dietary guidelines (FBDGs) translate scientific evidence into culturally appropriate and actionable recommendations to overcome malnutrition. They consider social, cultural, economic, ecological, and environmental circumstances and are vital for supporting the transition to healthier diets through multi-sectoral engagement.

The Ethiopian Public Health Institute (EPHI), the technical arm of the Ministry of Health, coordinated the development of these FBDGs in partnership with implementing sectors, international nutrition development partners, academia, faith-based organizations, media, and civil societies. The development of the FBDGs is in line with the Food and Nutrition Policy and its strategy. FBDGs realize the Ethiopian Public Health Institute's mission to improve the health status of the public by providing evidence-based information.

These FBDGs will guide consumers, nutritionists, educators, healthcare providers, health/agriculture extension workers, and other actors who work towards improving the nutritional status of individuals and the population at large. Furthermore, they will support food processing industries (private and public), health facilities, consumer associations, schools, and other stakeholders to achieve healthy and nutritious diets sustainably.

The guidelines contain 11 key messages to help the public in making healthier food choices and maintaining a healthy lifestyle. Out of the 11 key public messages, eight encourage consumers to implement healthy dietary practices, and the last three to limit the consumption of certain food groups to stay healthy. The actual FBDG implementation of the guidelines requires the active involvement of multiple sectors.

Finally, I would like to thank all food and nutrition implementing sectors as well as development partners for their participation in and contributions to the development of the guidelines. We hope the key messages and explanatory tips will foster healthy lifestyles.

Getachew Tollera (MD, MPH)
Deputy Director General
Ethiopian Public Health Institute

FOREWORD BY THE MINISTRY OF HEALTH

Ethiopia is experiencing all forms of malnutrition including undernutrition, micronutrient deficiencies, underweight, overweight and obesity; and diet-related diseases such as diabetes and high blood pressure. The prevalence of obesity, overweight and diet-related non-communicable diseases have increased leading to premature death and disabilities. There are also significant dietary gaps on many required nutrients for optimum nutrition. Food-Based Dietary Guidelines are an important source of information for promoting nutrition literacy and positive actions by consumers, government sectors and other food-systems actors, towards better diets and nutrition.

Responding to recommendations of food and nutrition-related policies and programs, the Ethiopian Public Health Institute (EPHI), the technical arm of the Ministry of Health (MoH), coordinated the development of Ethiopia's first Food Based Dietary Guidelines for the general population aged two years and older. This main document of the Food Based Dietary Guidelines has five sections and provides practical dietary advice through 11 key messages designed to foster improved dietary patterns and public nutrition literacy. The 11 key messages were informed by research findings and analysis of existing data. This document is for use by technical staff in different sectors (health, agriculture, education and others). A shorter booklet and flier on the Food Based Dietary Guidelines are planned and these will be accessible for use at community level by health and agriculture extension workers, teachers and others providing community services.

Furthermore, by paying attention to sustainability, the guidelines seek to promote attainment of healthy and sustainable diets. Therefore, the guidelines also have a broader role to inform action by diverse food-system actors including the private sector, consumer associations, development partners and others, to align their actions to contribute to the positive momentum towards Ethiopia achieving healthy nutritious diets. The Food Based Dietary Guidelines will also inform advocacy by civil society on promoting improved local access to nutritious healthy foods within local contexts.

The guidelines were developed through a consultative process with national food and nutrition implementing sectors, international nutrition development and research partners/organizations, civil society and religious institutions. We are grateful for the support of the United Nations Food and Agriculture Organization (FAO), Wageningen University and Research (WUR), the CGIAR Program on Agriculture for Nutrition and Health (A4NH) and the many professionals who contributed to the development of Ethiopia's Food Based Dietary Guidelines-2022. The guidelines will be translated into Amharic, Oromiffa, and other local languages and will be periodically revised as new evidence emerges. Adaptation to the FBDG to the pastoralist community is already started, and it will be finalized and released in English, Somali, Afar, and Oromiffa language.

HE Dr. Lia Tadesse
Minister for Health

FOREWORD BY THE MINISTRY OF AGRICULTURE

Agriculture plays an important and distinct role in improving nutrition outcomes. The Ethiopian Ministry of Agriculture (MoA) is taking a comprehensive strategic approach to maximize agriculture's contribution to improving nutrition and health by strongly linking agriculture to nutrition. The nutrition-sensitive approach used identifies opportunities that ensure agriculture contributes to better nutrition and health outcomes through both local and national food systems, without detracting from agriculture's conventional goals to produce food and other agricultural produce and to support meaningful livelihoods in the agriculture sector. In designing and implementing agricultural interventions, the nutrition sensitive approach explicitly targets positive impacts on food, nutrition and health outcomes.

Despite sustained growth and developments in agriculture, Ethiopia still ranks among food-insecure countries where millions suffer from various forms of under nutrition. The underlying causes of food insecurity include unavailability, inaccessibility and consumption patterns characterized by limited diet diversity and inadequate access to nutrient-dense and safe foods, as well as sustainability over time. Even households with access to sufficient nutritious food still suffer from poor nutritional status because of poor dietary practices leading to different forms of malnutrition.

Ethiopia has attained an important milestone by developing Food-Based Dietary Guidelines for Ethiopians two years and older. Agriculture has a leading role in assuring the better consumption patterns being promoted by the Ethiopian Food Based Dietary Guidelines by ensuring the availability and accessibility of a nutritious food basket for the public. Food Based Dietary Guidelines will provide guidance on the areas of focus under different agro-ecological settings. Positive development in our agriculture sector for food security and nutrition should be reflected by an increase in diet diversity at household level resulting from household production or through economic access, along with the other indicators that are monitored.

The Ministry of Agriculture firmly believes that the Food Based Dietary Guidelines will contribute to the realization of better nutrition and health outcomes for Ethiopians. The agriculture sector will contribute to this by increasing production diversity to improve diet diversity, and by increasing productivity for better food security. The FBDGs are an integral part of the Ethiopia Food Systems Transformation Pathway and Roadmap and will be used to inform the design and implementation of Nutrition-Sensitive Agriculture Programs. For this reason, the guidelines have the additional objective of promoting broad food- system actions that enhance diet quality and aid sustainability. The latter is another important contribution that the agricultural sector will strive for.

To this end, I would like to thank all sectors and development partners for their steadfast support and contributions to developing the first FBDGs for Ethiopia. The guidelines are crucial in informing and shaping nutrition-sensitive interventions by the Ministry of Agriculture.

HE Oumer Hussein
Minister for Agriculture

FOREWORD BY THE MINISTRY OF EDUCATION

In recent years, there has been increasing evidence that reflect that poor nutrition and health affect children's ability to learn. Inclusive access to education requires that children be able to attend school regularly, and learn effectively when in school. However, for poor students from vulnerable communities, school enrolment, regular attendance and learning ability are all compromised by illness, hunger and malnutrition. The impact of malnutrition on cognitive function and limiting education outcomes is now well-documented through the Africa Cost of Hunger studies by the African Union in collaboration with the World Food Programme (WFP) and several African countries including Ethiopia.

The 2013 Ethiopia Cost of Hunger study estimated that Ethiopia was losing about 16.5% of its gross domestic product (GDP) due to undernutrition. In addition, 16% of primary grade repetitions were associated with stunting. School grade, repetitions are costly to families, the education system and the national economy because of the additional resources spent on the repeated years of schooling. In Ethiopia, the annual economic cost of school repetitions associated with 'childhood undernutrition' was estimated at about 400 million Ethiopian birr (ETB), or 8 million United States dollars (USD). When the ability to learn is compromised in childhood, this leads to further costs arising from national economic losses due to the limited education outcomes and resultant limited earning capacity in adulthood.

Interventions for schoolchildren are therefore vital for improving the nutrition and health status of the population as a whole. Consequently, the Ministry of Education recognizes school nutrition and health and school feeding programs as critical investments that should be an integral part the education sector's development plan. The ministry has therefore recently endorsed a national school feeding policy framework and strategy to provide at least one nutritious school meal to all pre-primary and primary school children by 2030.

For the Ministry of Education, the FBDGs will provide guidance on the design and implementation of nutrition-sensitive school feeding and health programs across the country, and help with monitoring improvements on the quality of school meals. The guidelines and educational materials to be developed will be important references for educators who lack expertise in food and nutrition. Curriculum development will also benefit from the FBDGs towards improving nutrition literacy.

To this end, I would like to thank all sectors and development partners for the consistent support and contributions provided to develop the guidelines. It is an important resource for the nation and the education sector.

HE Professor Berhanu Nega
Minister of Education

ACKNOWLEDGEMENTS

The Ethiopia Food-Based Dietary Guidelines were developed through a series of consultations and collaborative efforts among food and nutrition implementing stakeholders. The actual FBDG implementation of the guideline seeks the active involvement of multiple sectors as well as public and private sectors.

The Ethiopian Public Health Institute acknowledges the contributions and commitment of stakeholders involved. Special appreciation is extended for the financial and technical contribution of the Food and Agriculture Organization, Wageningen University and Research as well the International Food Policy Research Institute and the CGIAR Research Program on Agriculture for Nutrition and Health. Our special thanks and appreciation go to Dr. Namukolo Covic whose technical support has been steadfast.

We would also like to warmly thank the bodies below for their unstinted technical support.

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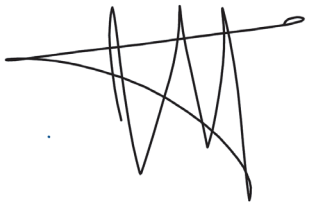

Masresha Tessema (PhD)
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SECTION 1: BACKGROUND

1.1 Overview of nutrition situation and food consumption patterns

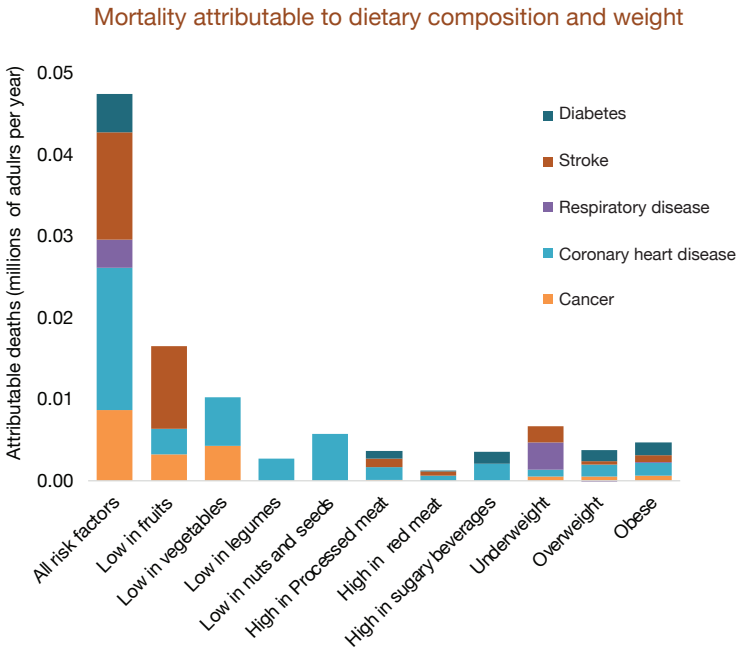
Unhealthy diets add to the burden of malnutrition and diet-related non-communicable diseases [2, 3], which are priority public health problems in low- and middle-income countries including Ethiopia [4–7]. According to the 2016 Ethiopian Demographic and Health Survey report, the prevalence of stunting (short height-for-age, 38%), underweight (low weight-for-age, 24%) and wasting (low weight-for-height, 10%) show the poor nutritional status of children under five [4]. The same report also indicated that 20% of women of reproductive age were underweight (body mass index [BMI] < 18.5 kilograms [kg]/metre [m]^2) and 13% overweight (BMI > 25 kg/m^2). This reveals that Ethiopia faces the triple burden of malnutrition, overweight and obesity, and micronutrient deficiencies [5–10].

National nutrition surveys in Ethiopia have repeatedly shown inadequate intake and deficiency of vitamin A, zinc, iodine, calcium, vitamin B12 and folate [11, 12]. Similarly, deficits of most of these nutrients have been reported as public-health problems among all population groups, but especially in women of reproductive age and children under five [13, 11, 12]. From study findings, reasons for this include excessive cereal consumption (teff, maize, sorghum etc.) which have a relatively low micronutrient density, and inadequate consumption of food items from other food groups such as animal-source foods (ASFs), pulses, fruits, vegetables, and nuts and seeds which are very rich in important micronutrients [14]. For instance, fruit and vegetable (F&V) consumption in Ethiopia is very low, with 85% of the population having zero servings; less than 2% of the population had 3–4 servings, and only 1.5% met the World Health Organization (WHO) recommendations of five servings per day. The same is true for ASFs except for the pastoralist areas with milk-based diets [15, 16].

Similarly, the 2016 Ethiopia Non-communicable Diseases and Injuries (NCDI) Commission Report revealed that diabetes mellitus, hypertension and injuries comprised the largest burden of non-communicable diseases in the country [17]. Dietary risk factors such as low intake of fruits and vegetables which are good sources of essential micronutrients are among the five leading causes of mortality and NCD [18]. A study based on 132 systematic reviews and meta-analyses conducted to identify major diet-related diseases showed that diet can play an important role in preventing and controlling cardiovascular disease (CVD), type 2 diabetes (T2DM) and deficiency of protein-energy and selected micronutrients [19]. Likewise, the Ethiopian 2015 Steps survey report based on a review of existing studies also indicated that NCDs can be reduced by preventing and controlling the four behavioural risk factors for NCDs: tobacco use, insufficient physical activity, harmful use of alcohol and consumption of unhealthy diets [16].

Understanding the role of foods, food groups and dietary patterns in optimizing nutrition, health and well-being of a population aids in designing diet-based prevention strategies and

in developing dietary recommendations [20]. Dietary recommendations are science-based suggestions and advice on habitual healthy dietary intake, and diet-related diseases and fatalities. Various dietary recommendations are normally formulated based on diet-related diseases and mortality profiles of countries, and these are known as FBDGs [21–23].



Source: https://globalnutritionreport.org/resources/nutrition-profiles/africa/eastern-africa/ethiopia/

Sources: New Sliced data estimates of food intake from the Global Dietary Database (August 2021), weight measurements from the NCD Risk Factor Collaboration, risk-disease relationships from epidemiological literature and mortality and population estimates from the Global Burden of Disease project.

Notes: Deaths (in millions) attributable to dietary risk factors by cause of death, for risks related to dietary composition and weight levels. The combined risk is less than the sum of individual risks because individuals can be exposed to multiple risks, but mortality is ascribed to one risk and cause. 'All risk factors' includes all deaths associated with dietary composition (i.e. diets low in fruits, vegetables and wholegrains; and diets high in processed meat, red meat and sugary drinks) and all deaths associated with weight levels (i.e. underweight, overweight, obese).

1.2 What are food-based dietary guidelines, and why are they important?

Food-based dietary guidelines (or dietary guidelines) are intended to establish a basis for food and nutrition, health and agricultural policies and nutrition education programs to foster healthy eating habits and lifestyles. They provide advice to the general public on foods, food groups and dietary patterns that provide the required nutrients, promote overall health and prevent chronic diseases. FBDGs include, among other tools, a set of science-based easily understood messages for the general public, often accompanied by an image or diagram as an aid to rapidly, accurately and readily understand the message [24]. Lack of appropriate dietary intake is one of the single most important causes of malnutrition which is in turn influenced by various factors starting from food availability at individual and national levels. Transition to healthier diets can only be driven by

food-based dietary guidelines that take into account the social, cultural, economic, ecological and environmental circumstances. FAO encourages countries to develop FBDGs which can be used in several ways, including the following:

- **Policy and advocacy tool:** FBDGs can be used as policy advocacy and programmatic tools to express demands such as the need to make healthy food available to the target population, by ensuring standards based on FBDG recommendations for a healthier diet.

- **Educational and capacity development tool:** As an academic and capacity development tool, FBDGs can be used by health providers, teachers, the media, extension and development agents, and others working directly with the public.

- **Quality improvement:** FBDGs also guide the food industry to improve the nutritional quality of food products to conform to the recommendations of the guidelines (e.g. reduce sodium, fat and sugar content); or by regulating/limiting the marketing and sale of products low in nutritional value and high in fat, sugar, salt and additives.

- **Shaping the food environment:** Dietary guidelines can also shape the food environment by setting standards for foods offered in public settings (schools, workplaces, hospitals, prisons, social canteens and restaurants).

- **Monitoring and evaluation (M&E):** As an M&E tool, FBDGs can be used by sector organizations to track, refine and improve annual plans, and to re-plan as may be needed.

Overall, well-implemented FBDGs through a food-system approach with inter-sectoral program and policy alignment are vital for achieving sustainable and healthy diets as defined below.

Box 1: Definition of sustainable healthy diets

Sustainable healthy diets are dietary patterns that promote all dimensions of an individual's health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable. The aims of sustainable healthy diets are to:

- achieve optimal growth and development of all individuals, and support functioning and physical, mental and social wellbeing at all life stages for present and future generations;
- contribute to preventing all forms of malnutrition (i.e. under-nutrition, micronutrient deficiency, overweight and obesity);
- reduce the risk of diet-related non communicable diseases; and
- support the preservation of biodiversity and planetary health.

Sustainable healthy diets must combine all the dimensions of sustainability to avoid unintended consequences. [1]

Source: FAO/WHO 2019 Sustainable Healthy Diets Guiding Principles document, http://www.fao.org/3/ca6640en/ca6640en.pdf

1.3 FBDGs as the game-changing solution for Ethiopia's food system

To make sustainable healthy diets available, accessible, affordable, safe and appealing, food-system changes are imperative. The food system is a complex web of activities involving the production, processing, transportation and consumption of food. It includes the governance and economics of food production, its sustainability, food loss and wastage levels, how food production affects the natural environment, and the impact of food on individual and national nutrition and health [25]. Recommended actions in the Ethiopian food systems position paper [37] include the development of national FBDGs as indicated in policy documents such as the Ethiopian Food and Nutrition Policy [26] and the National Food and Nutrition Strategy (2021-2031) [27]. In addition, a National Food System Assessment identified the need for a healthier diet to prevent malnutrition, and underscored the relevance of FBDGs [28]. FBDGs are one of the important game-changing solutions for effective and sustainable food-system transformation. In collaboration with national and international food-system experts, the Ethiopian government has identified 22 game-changing solutions for whole-scale transformation based on existing policies, institutions and programs [29].

These 22 game-changing solutions are clustered into six groups. The new Ethiopian FBDGs relate to most of them, but especially to the first two:

1. Nutrient-dense food production; food safety, fortification, and rural electrification and appropriate climate-smart technologies.
2. Supply and value chain development, national FBDGs, and nutrition literacy and awareness creation.
3. Integrated policy-making, land reform, and improved government finance provision for agricultural and rural transformation.
4. Agricultural technologies, innovation, and agricultural input supplies.
5. Access to markets, market information, infrastructure, and specialization.
6. Managing risk and protecting the resource-poor.

The FBDGs are among identified game-changing solutions in the Ethiopian food-system transformation plan. National priorities include improved nutrition literacy and diet quality characterized by increased diversity of safe nutritious foods appropriate for the local food culture.

Photo credit: ILRI/Flickr.

1.4 Why does Ethiopia need food-based dietary guidelines?

As explained in the previous section, nutritional deficiencies that stem from inadequate nutrient intakes are highly prevalent in Ethiopia, especially among women of reproductive age and children. Additionally, the prevalence of diet-related NCDs is high, emerging as the leading cause of mortality. The high undernutrition (stunting, wasting and underweight), micronutrient deficiencies in children and the rising prevalence of overweight/obesity and related NCDs reflect a poor diet. The adverse impact of malnutrition on school-aged children, adolescents, and women of reproductive-age age and related consequences affect public health and overall development.

FBDGs are imperative because:

- While the causes of malnutrition are complex and multi-layered, diet remains one of the single most important causes of malnutrition, albeit influenced by various factors from individual to national food availability. FBDGs which consider the social, cultural, economic, ecological and environmental circumstances are vital for supporting the transition to healthier diets.
- FBDGs can serve as an important tool for nutrition, health, agriculture and other sectorial policies and programs under the Ethiopian food and nutrition policy. They provide a unique opportunity for positive impact on diets and the food system from production to consumption.
- Well-implemented FBDGs will also link the different sectors and actors involved in food and nutrition, such as agriculture, health, education, food processors, academia, non-profit organizations and others. FBDGs can help identify production targets, monitor efforts, assess impact and help build the demand for healthier food options.
- The 2017 Ethiopia National Nutrition-Sensitive Agriculture Strategy calls for identifying and promoting locally available underutilized and nutrient-dense foods, including proper management of wild fruits. FBDGs complement these efforts.
- WHO cites unhealthy diets and lack of physical activity as some of the leading global risks to health; FBDGs promote and support healthier lifestyles.

Finally, the Ethiopian Food and Nutrition Policy and its strategy, the National Nutrition Program (2016–2020) both have FBDGs in the priority nutrition agenda list. This will bolster action by the government and food-system actors to make healthy diets affordable, accessible and acceptable, thereby helping reduce the risk of malnutrition in all its forms, and enabling the population to consume healthy diets and practice healthy lifestyles.

1.5 Principles considered in developing the food guide

The food guide has graphic representations with key messages and tips for respective dietary guidance. The Ethiopian food guide and message development process was based on FAO standard recommendations. Informed by professionals from WUR and FAO, the committee identified the four guiding principles below for developing the food guide, key messages and tips.

Principles adopted in developing the FBDGs

Acceptability

- Positively influence consumer behaviour and usage [30]; create interest among extension workers in health and agriculture so that they use the FBDGs for awareness creation; ensure fit within the organizational culture and be in line with their values and messages; assess FBDGs based on actual demand from both program deliverers and recipients to monitor if FBDGs serve their purpose.

Cultural appropriateness

- Account for current food habits of target populations; respect religious or cultural beliefs for acceptance by the general population [31]; propose small changes to current diets when possible and use familiar foods for better acceptance; use words and graphics appropriate for the community; careful considerations of traditional food-preparation techniques, portion sizes, frequency of recommended servings, evaluation, and revision of the FBDGs among intended users for cultural appropriateness [32].

Comprehensibility

- Considering the varied literacy and illiteracy levels within populations, FBDGs should be written in an easy-to-understand manner [31]; terminology used should be simple, self-evident and refer to foods instead of nutrients to avoid misinterpretation; foods should be grouped in a way that makes sense to the target population, instead of only to nutritionists; visual representations of the FBDGs should be readily understood and easy to remember by consumers.

- The way messages get transferred to target populations plays a key role in clearly understanding the messages and assuring adoption. Testing the FBDGs on comprehensibility is required to take all the stated aspects into account before the FBDGs are finalized [32].

Practically applicable

- The FBDGs should recognize the social, economic, agricultural and environmental conditions associated with foods and eating patterns [31]. The recommended food groups should be affordable, widely available and accessible to most people, taking into account the geographical variation. Adhering to the FBDGs should be possible within existing means, resources and circumstances of the majority of the target population. FBDGs should be flexible and inclusive for use by people with different lifestyles, ages and physiological conditions.

1.6 Policy framework for food and nutrition: Implications for diet quality

Ethiopia's current nutrition policy environment is favourable for addressing malnutrition across multiple sectors. This is reflected through the recognition of the importance of nutrition across nutrition-specific and nutrition-sensitive strategies, poverty reduction and social protection programs, and nutrition-related laws. There are various strategic policy documents to improve

nutrition in Ethiopia which provide opportunity for FBDG adoption. Some of the key documents are listed below. The technical workforce responsible for FBDG development believes that based on the list below, Ethiopia's FBDG development is in line with current government policy priorities on food and nutrition.

Nutrition-related policy framework in Ethiopia

The National Food and Nutrition Policy (2018) provides an overarching framework covering the key dimensions of food and nutrition security, including sustained food availability, accessibility and utilization of food; food safety and quality; post-harvest management; and optimal nutrition security at all levels of society, agro-ecological zones and livelihoods as well as in recurring emergencies [26]. The FBDGs for Ethiopia will address priority message areas for public awareness and policy dialogue using appropriate FBDG tools.

The National Food and Nutrition Policy Strategy (2021–2031) was designed to operationalize the food and nutrition policy. The strategy identifies seven priority intervention areas as policy directions. The areas are (1) Ensure the availability and utilization of diversified, safe and nutritious food; (2) Ensure the safety and quality of foods from farm to table; (3) Improve post-harvest management of agricultural products; (4) Ensure optimum nutrition at all stages of life; (5) Create a system for an effective food and nutrition emergency response; (6) Promote effective nutrition communication; and (7) Create an effective food and nutrition governance. These policy directions are intended to be implemented by sectors through incorporation in sectoral plans. The current FBDGs are in line with the Ethiopian food and nutrition policy, which can inform the minimum dietary standards that can promote improved consumption patterns and provide direction on the food system transformation needed to address diet quality effectively [33].

Nutrition-Sensitive Agriculture Strategy (NSAS; 2016): Endorsed in 2016, the NSAS was developed to strengthen the synergy between agricultural initiatives and national nutrition program initiatives. The strategy has six strategic objectives directly related to the FBDGs: (1) To embed nutrition into agricultural policy, strategy, program sand workplans at all levels; (2)To establish/strengthen institutional and organizational structures and capacity for planning and to implement nutrition-sensitive agriculture; (3) To increase year-round availability, access and consumption of diverse, safe and nutritious foods; (4) To enhance the resilience of vulnerable communities and households prone to climate change and moisture stress; (5) To ensure women's empowerment and gender equality; and (6) To establish/strengthen multi-sectoral coordination within agriculture and with signatories of the National Nutrition Program II and other development partners [34].

Agriculture Growth Program (AGP): Launched in 2015, the AGP-II aims to increase agricultural productivity and commercialization of smallholder farmers and contribute to improved dietary diversity and consumption at household level. The second AGP program emphasized nutrition by adding improving dietary diversity as an objective of the program [35]. Promoting diet diversity is also one of the aims of the FBDGs.

SEQOTA Declaration: The Seqota Declaration expresses the government's commitment to end stunting in children under two years of age by 2030. It includes social protection, education; water, sanitation and hygiene; and other sectoral goals [36].

Productive Safety Net Program (PSNP-IV): PSNP is a cash and food transfer safety net program first launched in Ethiopia in 2005. It aims to improve food security. The current phase of the program is more nutrition-sensitive. Nutrition-sensitive components of the program include nutrition-related conditionality (nutrition-related behaviour change communication) and the addition of pregnant and lactating women and malnourished children as temporary direct support beneficiaries [37].

Growth Transformation Plan (2015–2020): includes stunting as a key indicator; emphasizes food security and nutrition as main priorities [38].

Health Sector Transformation Plan (2015–2020): guides implementation of health interventions and monitoring key indicators, including nutrition indicators.

Enabling environment: Nutrition-relevant laws such as maternity protection laws for 120 paid days, implementing the Code of the Marketing of Breast Milk Substitutes, salt iodization regulation and optional wheat and oil fortification standards create an enabling environment to implement some nutrition interventions.

Photo credit: ILRI/Flickr.

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Photo credit: ILRI/Flickr.

Photo credit: ILRI/Flickr.

Photo credit: Yitagessu Mergia.

SECTION 2: THE FBDG DEVELOPMENT PROCESS, GOAL AND OBJECTIVES

2.1 Establishing technical working groups and steering committees

The development process of the Ethiopian FBDGs was adopted from the preparation and use of food-based dietary guidelines joint FAO/WHO Consultation report (WHO Technical Report Series 880) and the Dutch food-based dietary guidelines development process [39]. The Ethiopian Public Health Institute (EPHI), which is the technical arm of the Ministry of Health, coordinated the development of the food-based dietary guideline process in partnership with national and international organizations including FAO, WUR, the International Food Policy Research Institute (IFPRI) and the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH). They have experience in providing technical support for FBDG development. The initial step was to develop an inception report, sign an agreement with partners and establish the national multi-sectoral Ethiopia FBDG Development Committee. Annex C lists organizations that participated in the FBDG consultative meetings and training workshop.

2.2 Consultative workshops, aim and process

2.2.1 Consultative FBDG workshops

After selecting committee members, the workshops and meetings below were held for sequential step-by-step activities on FBDG development.

- **Setting the FBDG development framework:** The methods for the FBDG development process was accomplished during the first national workshop held in June 2018. The workshop's aim was to initiate the development process by setting the methodological framework in preparation for the activities to be rolled out. Thereafter the committee developed an annual workplan and established a schedule of regular meetings to accomplish identified activities.

The FBDG development Technical Working Group selected six topics for evidence review to inform FBDG development.

1. Priority diet-related diseases and diet relationship
2. Dietary intake gaps in Ethiopia
3. Food availability, seasonality and accessibility in Ethiopia

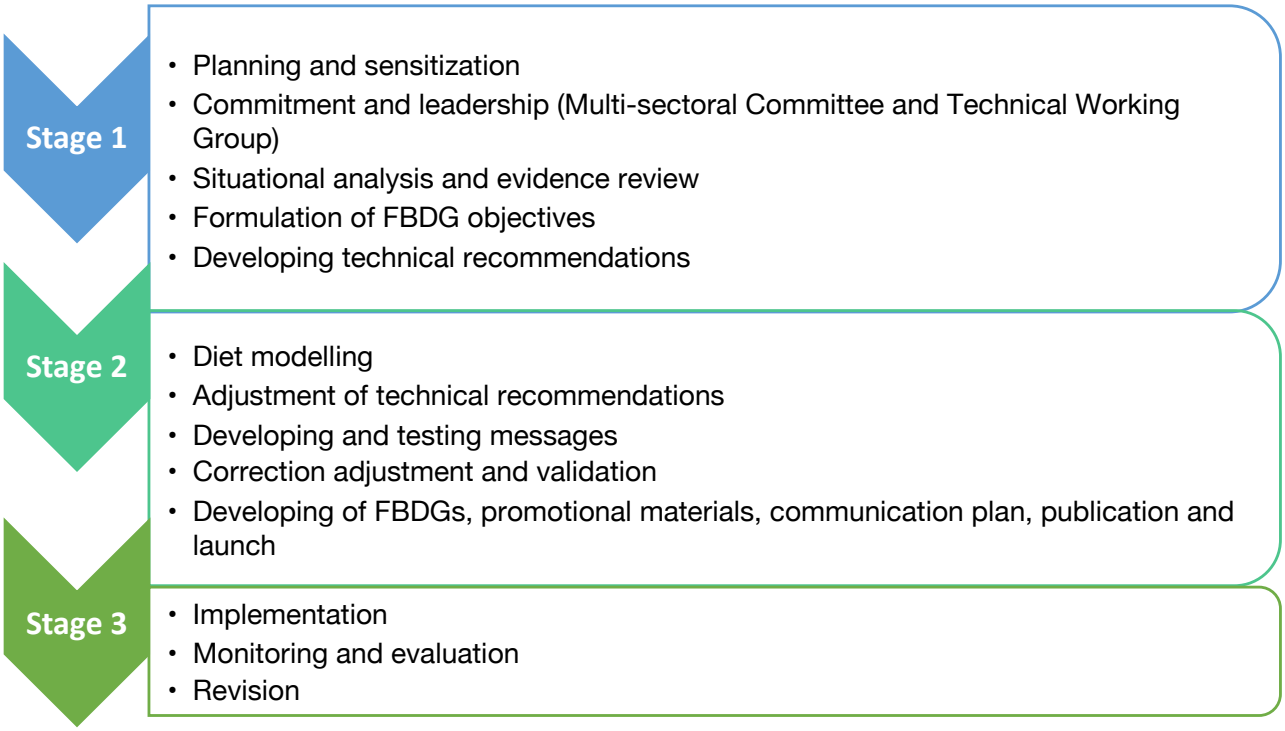
4. Determinants of food choice in Ethiopia

5. Review of social and behaviour change communication interventions

6. Ethiopia's food treasures

- **Setting technical recommendations:** The second national workshop entitled Developing technical recommendations and translating them into public messages was organized in May 2019. This workshop formulated technical recommendations for the FBDGs based on literature reviews and secondary data analysis findings and translated the technical recommendations into public-health messages. Based on other countries' experiences and on discussions with the technical committee and global experts, the summary of steps presented below was adopted for developing Ethiopia's FBDGs development (Figure 2.1).

Figure 2.1. Steps for developing food-based dietary guidelines.



Source: Pena, M. and Molina, V. (1999). Food-Based Dietary Guidelines and Health Promotion in Latin America. PAHO & INCAP [40]

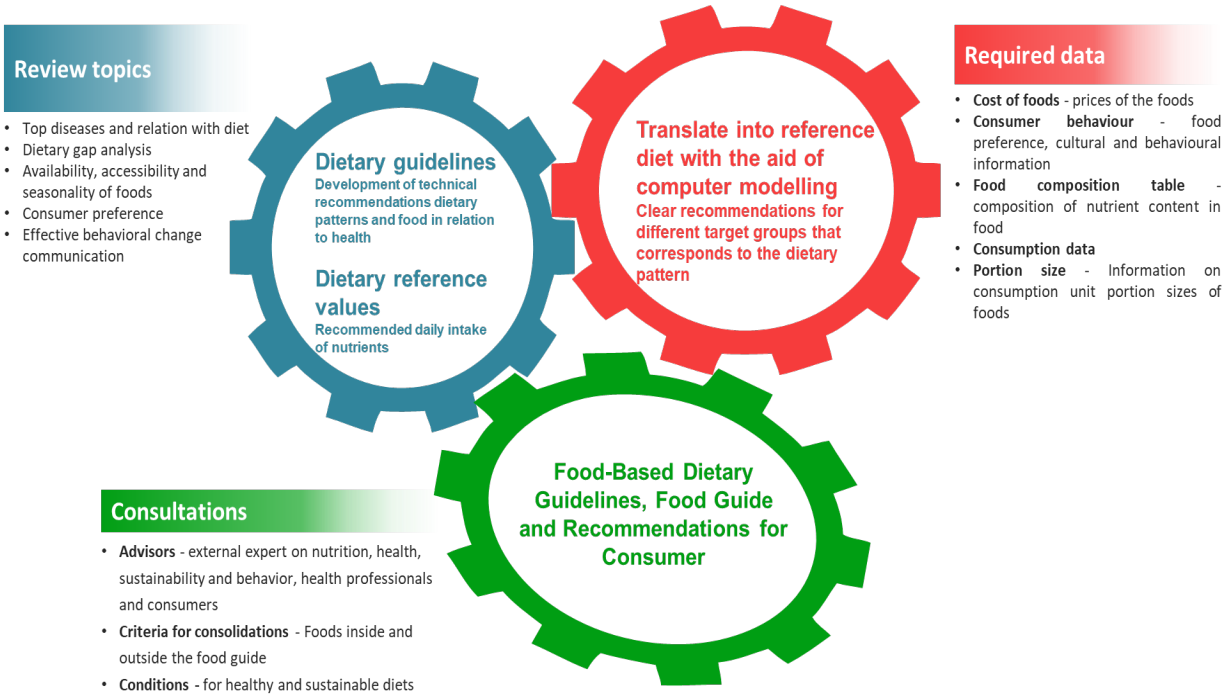
The steps in Figure 2.1 were divided into three phases in the methodological framework designed by EPHI and WUR.

- Phase 1: Develop FBDG objectives, technical recommendations and public messages

- Phase 2: Translate into reference diets using linear programming (diet modelling)

- Phase 3: Evaluate the messages and reference diet, develop a food guide (food graphics) and compile the FBDG comprehensive report.

Figure 2.2. The three phases of Ethiopia's FBDG development.



2.2.2 Translating technical recommendations into public health messages

Based on FAO guiding documents and experience in other countries, specific steps were considered in translating technical recommendations into public messages. Below are the recommended steps adopted for Ethiopia's FBDG development.

Step 1: Identify the problem: From each of the review topics, identify priority problems that can be tackled with FBDGs by reviewing the evidence, and national documents and strategies. If the priority problems are numerous, consider combining, or removing overlaps to reduce them.

Step 2: Prioritize identified problems: Make a shortlist of problems by prioritizing them using the following criteria:

- The urgency for guidance (depending on the magnitude of the problem, such as significant area of public health concern or emerging area for public health action).
- Feasibility of solving the problem through consumer messages in the FBDGs. Take the top 10–15 priority problems and analyse them, if relevant by critical nutrients (if any); critical foods (if any); do a knowledge, attitude and practice assessment on the problem.

Step 3: Propose technical recommendations: Develop technical recommendations for each of the priority problems. Generally aim for 3–5 recommendations for each problem.

Step 4: Select the top 6–10 technical recommendations, always keeping in mind the evidence presented, which will form the basis of the FBDG messages.

Step 5: 'Translate' the technical recommendations into FBDG messages.

Proposed characteristics of suggested public messages: FAO recommends that public messages derived from technical recommendations have certain characteristics. These include being consumer-centred which is based on what the target population believes, feels and thinks; incorporating tips that help consumers use their common sense to improve their lives; and being action-oriented, including what to do and how to do it. In addition, the following key questions were recommended to be considered when field-testing the FBDG messages:

- What is the population's willingness and ability to adhere to the FBDG message?
- What are the perceived benefits of the FBDGs message?
- What are the perceived barriers and facilitators for implementing the FBDGs?
- Are the FBDG messages clear and culturally appropriate?

2.2.3 Principles to consider in developing Ethiopia's FBDG messages

Box 2: Principles to consider in developing key messages for the public

1. Promote a diversified diet
2. Include recommendations for pregnant and lactating women
3. Include recommendations on cooking time and skills, focus on cooking practices that preserve nutrients
4. Include the following food groups:
    - Wholegrain cereals, root crops and tubers
    - Fruits
    - Vegetables
    - Legumes
    - Animal-source foods: dairy products, meat, fish, eggs
5. Include messages about:
    - Limiting intake of fat/oil rich in saturated fatty acids, processed and red meat and alcohol
    - Limiting the addition of salt and sugar in foods and drinks, including coffee
6. Address food-safety concerns

2.3 Goal and objectives of Ethiopia's Food-Based Dietary Guidelines

The FBDG development Technical Working Group (TWG) recommended the following goal and objectives after priority problems were identified.

Goal: To reduce malnutrition and diet-related public health problems in the country by developing FBDGs and by promoting a healthy diet among different population groups.

Objectives: The main objectives of the FBDGs are:

1. Provide dietary recommendations for the Ethiopian population two years and older to increase diet quality, including diversity and food safety, for achieving optimal health.
2. To promote broad food-system actions supporting diet quality while being sensitive to sustainability.

2.4 Target audiences and scope for Ethiopia's FBDGs

The FBGDs are intended for the general population two years old and older in Ethiopia's urban, rural and pastoral settings. The working group agreed to exclude children younger than two years due to the presence of infant and young children feeding (IYCF) materials that are well-aligned with global evidence and the local context. The guideline will also be used by government sectors, non-governmental organizations (NGOs) and United Nations (UN) agencies, universities and research organizations, industries, schools, professional associations, the media and social workers. The FBDGs are intended to support national and regional strategies, policies and programs through the multi-sectoral engagement of the Food and Nutrition Policy signatory sectors.

2.5 The proposed Ethiopian FBDG tool-kit

Based on discussions and recommendations during the 2nd national FBDG workshop, materials were suggested for Ethiopia's FBDG toolkit (Box 3). Following the endorsement of the FBDGs by the government, relevant sectors will use the guidelines. Electronic and print media will be used to disseminate key public messages.

Box 3: Proposed FBDG toolkit

1. Ethiopia's Food-Based Dietary Guidelines
    - This is the main document that shows the FBDG development process and recommended key messages and tips for public use
2. Food graphics with messages and tips: for public use
3. Social and behaviour change communication (SBCC) materials to be developed
    - Revising the existing SBCC/IYCF-aligned SBCC materials in the context of the FBDGs
    - Develop new SBCC materials for different target populations such as school-aged children (school games, songs), adolescent girls and adults
    - Different materials for urban and rural populations (posters, brochures, booklets)
4. Policy briefs on the country's entire food system in the context of Ethiopia's FBDGs
    - This will be used as an advocacy tool on how FBDGs can be used to complement other game-changing solutions through the food system

2.6 Food graphics, key message testing and report findings

Key messages: In early 2020, the TWG set health and nutrition objectives and drafted 15 technical recommendations/key messages with additional tips. These recommendations were refined and collated into 11 key messages for the public.

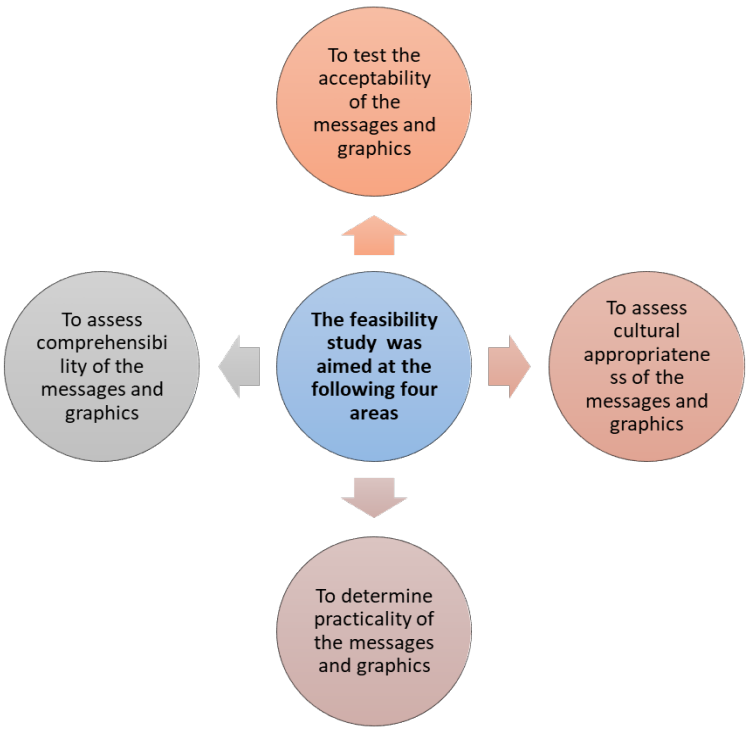
Box 4: Revised key messages for the public

1. Eat a variety of foods every day including fruits, vegetables, legumes and animal foods
2. Eat legumes such as beans, chickpeas, peas and lentils every day
3. Eat a variety of fruits and vegetables of different colours such as banana, papaya, kale, carrot and tomato every day
4. Diversify your diet with nuts and oilseeds such as Niger seeds
5. Add animal-source foods such as eggs, milk and meat to your everyday meals
6. Drink a minimum of 8–10 glasses of clean water daily
7. Stay healthy by doing daily physical activity for at least 30 minutes daily
8. Use fats and oils sparingly
9. Limit the use of sugar, sweets and sugary soft drinks
10. Limit the use of salt
11. Limit alcoholic beverages, both factory-processed and homemade

Note: The tips for each key message are included in Section 4 along with quantity, based on results from diet modelling.

Field-testing the key messages: During the second phase of guideline development in 2020, the TWG at EPHI tested these graphic-based public messages for their comprehensibility, cultural appropriateness, practicality and acceptability by target users. Field testing was conducted among 17 high-level nutrition experts, 30 health and 15 agriculture extension workers and 40 women of reproductive age. A qualitative study with focus group discussions and key informant interviews was designed and conducted to understand the areas as shown in Figure 2.3.

Figure 2.3: The four areas of focus of FBDG testing and the corresponding objectives.



Findings from the field testing: Based on the study findings, there is high interest to implement the dietary guidelines by all study participants once they are officially released. The study participants' view was that most of the messages align with the current nutrition education materials implemented in the country except for the messages on physical activity and alcohol. However, suggestions were made that technical terms like over-processing, wholegrain, and safe and balanced diet should be defined in simpler terms for better understanding. Affordability, availability and access to the market were the major barriers reported for consumers to implement the guidelines. Findings show that the guidelines should address fasting and traditional cooking methods, and thereby be more inclusive by taking into account cultural practices and religious beliefs. The conclusions of this study were presented virtually to selected stakeholders, and feedback gathered was used to refine food graphics and key messages.

2.7 The 3rd virtual consultative meeting and the way forward

Virtual consultative meetings organized by EPHI were held on FBDG development. Participants were from EPHI, IFPRI, WUR, the United Nations Children's Fund (UNICEF), Ministry of Agriculture (MoA), Hawassa University, Bahir Dar University, Ethiopian Institute of Agricultural

Research, Central Statistical Agency, Addis Ababa University's College of Public Health and FAO-(Ethiopian office and headquarter). The main aim of these periodic meetings was progress update; discussing findings of the dietary assessment and feasibility study; feedback on the FBDG draft and graphics; agreement on next action points, including developing an implementation action plan with timeframe and responsible bodies; obtaining diet modelling training for the TWG to model diets for additional population groups; and organizing and coordinating a review of the FBDG document by national- and global-level reviewers.

2.8 Refinement of key messages and graphics

The study team took into consideration the feedback from the field test and virtual consultative meetings, and further efforts were made to refine key messages and graphics. Selected national TWG members from different sectors and development partners provided their feedback on current versions. Based on this, the following minor changes were made:

- graphics were further revised to make them clearer
- additional graphics were added where needed
- graphics for physical activities were revised to represent males and females across the lifecycle.

2.9 Diet modelling and findings on three different energy levels

2.9.1 Process of the diet modelling work

Diet optimization can help translate nutrient needs into food choices, taking into account many other food-related characteristics (food-consumption habits, food price, environmental impact, food safety etc.). This guideline was developed using the FAO Excel-based diet modelling package; Solver (free Microsoft Office Excel add-in tool). It calculated country-specific food-intake patterns at various calorie levels to meet the nutritional needs of various population groups/energy levels. Also illustrated in food graphics in the form of pie charts/plate of food were quantitative recommendations, proportions of food groups and number of servings of each food group necessary to meet the specified nutritional requirements, acceptability constraints and cost constraints (in the model). In this regard, diet modelling was conducted to formulate diet patterns/guides, ensuring that they were in line with FBDG recommendations at various energy levels for various population groups.

Results of the diet modelling were used to prepare and determine proportions in the visualization of the food graphics. Based on the model, quantitative results of optimized models were presented as amount in grams (g) per food group. This helped us to assess the feasibility of the technical recommendations and provides estimates on the qualitative diet goals to be included in the guidelines. e.g. "Increase the consumption of nuts and seeds".

2.9.2 Methodology

For the development of this guideline, two methodologies of diet modelling were done: (1) individual-based modelling using 2019 survey data on 500 households collected from women of reproductive age (2) population-based modelling using 2011 food-consumption data. Each method had its own distinctive objectives and procedures. We used both models to enable comparison in terms of feasibility of recommended amounts for a given population.

Individual-based optimization

In this method, individual food habits are taken into account and one diet is modelled for each individual of the population. For each model, the decision variables are the foods consumed by the individual, complemented, if necessary, by 'new' foods (i.e. foods not currently consumed by the individual but consumed by the wider population). The aim is to deviate as little as possible from each individual-observed diet.

Steps for Individual-based optimization

Individual diet modelling for women of childbearing age and the optimized population diet for a middle energy requirement (2,300 kilocalories [kcal]/day) were used to determine the recommended intake for the general population above two years. The recommended amount was taken from 500 women of childbearing age with 2 dietary recalls. Diet optimization was chosen because the model assumes that the optimized energy intake deviates from the current energy intake with a maximum of 5 percent). The optimized population diet for middle energy (2,300 kcal) was chosen because the targeted energy is closer to the median energy of the individual optimized diet.

Population-based optimization

One diet was modelled for the whole population and the decision variables are the food items or food groups that are mostly consumed by, or potentially available for, the population of interest. It is assumed that all foods are potentially acceptable for all Individuals in the population of interest. The aim is to stay as close as possible to the average observed diet. An equal target of energy/calorie intake was set for two scenarios; fasting and non-fasting as constraint for each energy level.

Box 5: Recommended calorie intake by subpopulation energy requirement

Recommended calorie intake for subpopulations in the lowest-energy requirement (1,250 kcal/day)

- The subpopulation group in the lower-energy requirement are children (both boys and girls) aged 2–5 years

Recommended calorie intake for subpopulations (fasting and non-fasting) in the middle-energy requirement (2,300 kcal/day)

- The subpopulation group in the middle-energy requirement are school-aged children (both boys and girls) aged 6–18 years, and the elderly (both women and men) 65 years and above

Recommended calorie intake for subpopulations (fasting and non-fasting) in the highest energy requirement (2,700 kcal/day)

- The subpopulation group in the middle-energy requirement are adult men and women aged 19–64 years

Steps considered for population-based modelling

1. Establishing food groups for diet modelling and classifying foods into groups; preparation of food composition table using Ethiopian Food Consumption Survey data (EFCS), 2011
2. Creating food list for each food group; selecting foods and giving their relative percentage contribution weight to their food group according to actual consumption (based on the mean consumption of EFCS, 2011)
3. Assigning price information per 100 g for each food (data from CSA)
4. Selecting a 'sentinel food' for each food group and setting a serving size so that a specific amount of energy is contributed by a serving from that particular food group
5. Setting nutrient constraints; percentages of energy contribution from protein, fat and carbohydrates (allowed ranges); micronutrient targets for 'problem' nutrients (exact amount or range); percent of energy allowed from any discretionary caloric groups.
6. Setting acceptability constraints; minimum–maximum weight in grams (or number of servings) to be included per day for each of the food groups which are fairly close to observed portion size values.
7. Running the Solver and examining the dietary pattern; interpretation for all energy levels/ target groups and communication of results

Results from both models

Each of the optimized model results were compared with Global Dietary Recommendations and amounts were determined as average and also set in ranges. See Annex B.

2.9.3 Recommended intake and estimations of serving size

- The recommended amount for the general population above 2 years was estimated based on the population diet, applying an average energy level and individual diet modelling, but also including modelling results for non-fasting, continuous fasting and intermittent fasting
- The recommended amount for ages 2–5 years was estimated based on the population diet that requires a low-energy level
- The recommended amounts for ages 6–18 years and the elderly (65+ years) were estimated based on the population diet that requires a middle-energy level
- The recommended amount for continuous fasting was estimated based on individual diet modelling for women of reproductive age

- The recommended amount for Intermittent fasting was estimated based on the population diet requiring high-energy levels and individual diet modelling for women of reproductive age.

Table 1. The recommended intake of different food groups in grams per day+* for the general population and various age-range subpopulations from individual and population diet modelling

Food group	General population above 2 years (g)	2–5 years (g)	6–18 years and 65+ years (g)	19–64 years (non-fasting) (g)	19–64 years (intermittent fasting) (g)	19–64 years (continuous fasting) (g)
Grains, white roots and tubers	570 (400–650)	490 (450–500)	600 (500–800)	650 (500–800)	600 (500–800)	600 (500–800)
Pulses	90 (80–115)	90 (80–115)	115 (80–115)	90 (90–120)	100 (90–150)	200 (100–250)
Nuts and seeds	15 (10–20)	15 (5–20)	10 (5–20)	15 (10–20)	15 (10–25)	50 (20–60)
Milk and dairy foods	250 (200–400)	200 (150–250)	200 (150–250)	250 (150–300)	250 (0–400)	0
Meat and eggs	30 (20–50)	30 (30–50)	50 (30–50)	45 (40–90)	40 (0–90)	0
Fruits	150 (110–160)	100 (100–150)	150 (100–200)	150 (100–200)	150 (100–200)	200 (150–250)
Vegetables	130 (100–140)	75 (70–100)	95 (70–100)	120 (100–170)	130 (100–150)	135 (100–150)
Fats and oils	15 (10–17)	15 (10–17)	15 (10–17)	15 (10–17)	15 (10–17)	15 (10–17)
Added sugar and SSBs	15 (0–31)	15 (0–31)	15 (0–31)	15 (0–31)	15 (0–31)	15 (0–31)
Salt	<5 (0–3)	<5 (0–3)	<5 (0–3)	<5 (0–3)	<5 (0–3)	<5 (0–3)
Alcohol	50 (0–150)	0	0	50 (0–150)	50 (0–150)	50 (0–150)
Physical activity+	>3 (3–5)	>3 (3–5)	>3 (3–5)	>3 (3–5)	>3 (3–5)	>3 (3–5)
Potable water*	>8 (8–10)	>8 (8–10)	>8 (8–10)	>8 (8–10)	>8 (8–10)	>8 (8–10)

Notes:

+days/week: at least 30 minutes per activity day

*glass/day: average estimated based on the current intake, optimized individual diets and population diet

Pregnant or breastfeeding women should take at least one additional meal from the food group that is not part of their main meal for the day

The recommended amounts given for the general population are an average amount that can be used for public messages and tips

Table 2: Recommended amount and equivalent serving size among different age groups

Food group	Sentinel food	Serving size(kcal)	Equivalent amount ingrams (mea-sured)	In local measurement unitconvenient for the public
Grains, roots and tubers	Injera, bread	300	Average from 310 g of injera and 150 g of bread = 230 g	1 medium-size injera or 1.5 pieces of bread
Pulses	Shiro stew	115	100 g (shiro)	1 medium sized scoop of stew
Nuts and seeds	Sunflower seeds	50	10–15 g (sunflower paste (suf fitfit))	1 Tablespoon
Milk and dairy foods	Milk	90	200 g (milk)	1 cup
Meat and eggs	Egg and beef stew	65	Average from 50 g of eggs and 85 g of meat stew (67 g)	1 egg or 1 portion of beef stew
Fruits	A standard used by other countries' FBDGs	80	Average from 150 g of banana and 100 g of mangoes = 125 g	1 medium banana or 1 medium mango
Vegetables	A standard used by other countries' FBDGs	30	80 g (cooked vegetable)	1 medium-sized scoop
Oils and fats	Oil	130	8 g (oil)	1 Tablespoon

Note: Sentinel foods are commonly consumed foods that are taken to represent each food group for the purpose of defining the serving size (in calories)

SECTION 3: BRIEFS ON FOOD AND NUTRITION

3.1 Introduction

This section (3) presents brief information on terms used in Section 4, which carries the 11 key messages of the FBGDs. The key messages and tips are part of the FBDG communication package, translating current scientific knowledge into public messages relevant to Ethiopia. The main aim is to enable the population to choose foods and beverages as part of a healthy diet for maximum health.

The 11 key messages inform the public about the benefits of each food group for a healthy lifestyle that can be practiced in a very simple way. The graphics and visuals used in the Food Guides illustrate and convey the FBDGs' main messages and tips. The graphic representation of the guide is a 'healthy plate' with various food items on it representing the food groups and key messages on each food group.

The first seven of the 11 public messages described in Section 4 encourage consumers to implement healthier dietary practices, while the last 4 public messages advise limiting certain food groups to stay healthy. To easily understand the messages and tips provided in the FBDGs, simple explanations of selected terms related to food and nutrition are described below.

3.2 Food and nutrients

Food is something we eat which provides nutrients. Nutrients are substances that provide us the strength and energy for activity. Nutrients are needed for growth and all bodily functions such as breathing, digesting food, staying warm, repair of the body and for keeping the immune system healthy. There are different types of nutrients in the food we eat. They are divided into the following two major categories:

- **Macronutrients:** nutrients that our body needs in a large amounts
- **Micronutrients:** nutrients we only need in small amounts.

3.3 Food groups

Food groups classify various foods based on similarities in nutrient content. Food groups are the basis of a practical guide that can help plan your daily diet to increase the likelihood of meeting nutrient requirements by simply following the recommended number of serving sizes per day for each food group. Hence, as much as possible, this food guide uses foods and food groups in a very simple way so that it is easily understood by the public.

Box 3.1 Categories of nutrients

1. Macronutrients
   - Carbohydrates in bread, injera, rice, kocho, cassava
   - Fats in butter and oil
   - Proteins in eggs, meat, milk and legumes
2. Micronutrients
   - Minerals: such as iron, iodine, zinc, found in animal-source foods
   - Vitamins: vitamins A, B, C, D, E and K found in fruits and vegetables

3.4 Different food groups

Different foods contain nutrients needed for good health, growth and development. There is no single food (except breast milk for infants below six months) that can provide all the nutrients needed for health, physical and brain growth. The best way to ensure that we get enough of each nutrient and enough energy is to eat a mixture of foods. The section below briefly presents the different types of food groups and their benefits.

- **Staple foods:** Cereal grains such as teff, barley, maize, sorghum, root crops and tubers such as enset and cassava are the major staple foods in Ethiopia. Cereal grains and root crops are good sources of energy, plant protein, B vitamins, minerals and dietary fibre, particularly when wholegrains are eaten such as dark-coloured barley and oats. Consumption of wholegrains lowers the risk of CVD mortality and improves gut health [41].

- **Legumes:** such as peas, lentils, broad beans and soya beans are good sources of proteins, minerals and vitamins. Those with more proteins such as beans and peas combat protein-energy malnutrition while also providing other nutrients. Eating legumes lowers your BMI, slows down weight gain over time and decreases occurrence of CVD and T2DM.

- **Nuts and oilseeds:** are good sources of minerals and unsaturated fat. Common nuts and oilseeds in Ethiopia include groundnuts, sunflower seeds, sesame seeds and Niger seeds. Nuts and oilseeds are very good sources of vitamins with anti-oxidative properties such as vitamin E and beta-carotene. Adding sunflower seeds and peanuts in kolo (roasted cereals and legumes served as a snack) is already well-established in Ethiopia. It should be encouraged as a wider practice. Sesame seeds have a high antioxidant content (vitamin E and beta-carotene) than other oilseeds. Eating 15–30 grams of nuts every day reduces CVD risk.

Photo credit: Yitagesu Mergia.

- **Milk and milk products:** Animal milk, yoghurt and cheese are good sources of energy and nutrients (such as fat, protein and minerals, for forming strong bones and teeth), and of vitamin A that is excellent for sound vision. Milk and milk products combat child stunting.

- **Meat, poultry, eggs and fish:** ASFs such as meat, poultry, eggs and fish are very good sources of high-quality (complete) protein and vital micronutrients such as iron, zinc and vitamin B12.

  Meat consumption helps improve the iron status. But processed meat (such as canned beef, sausage), though not common in Ethiopia's consumption, is associated with T2DM and CVD. Fish is also rich in healthy fats (omega fatty acids)

  Moderate fish consumption (2–3 servings per week) is associated with a lower coronary heart disease (CHD) risk. Long-chain polyunsaturated fatty acids, protein, iodine and selenium are abundant in fish.

- **Fruits and vegetables:** Fruits such as papayas, avocados, mangoes and bananas are excellent sources of pro-vitamin A carotenoids, vitamin C and minerals. Vegetables such as kale, broccoli, cauliflower and beetroot also have important vitamins and minerals needed for our health. Consumption of fruits and vegetables can help combat multiple nutrient deficiencies.

Photo credit: ILRI/Flickr.

- **Fats and oils:** The fats and oils food group consists of different types of fatty acids: those which are solid at room temperature are saturated fatty acids while those which are liquid are unsaturated fatty acids. Fats are concentrated sources of energy: for example, one spoon of cooking oil contains twice as much energy as one spoon of starch or one spoon of sugar. Fats contain fatty acids needed for growth. Fats also help the absorption of certain vitamins such as vitamin A.

Besides pure visible fats such as butter and oil, plant-based fat is also available in certain food items such as oilseeds and avocados which are good for health.

Box 3.2: What you need to know

When vegetable oils are processed to harden them for margarine and other solid fats, some of the unsaturated fatty acids are changed into trans-fatty acids. These behave like saturated fatty acids. Increased intake of trans-fats (>1% of total energy intake) is associated with increased risk of CHD mortality. Worldwide, trans-fat intake is responsible for approximately 500,000 premature deaths from coronary heart disease (CHD) each year. We should eat as little as possible of the foods containing trans-fatty acids. Examples of foods containing trans-fatty acids are margarine, lard (shortening) fried foods such as potato chips, commercially fried foods such as doughnuts, as well as baked goods such as biscuits and cakes.

https://www.who.int/teams/nutrition-and-food-safety/replace-trans-fat

- **Sweets and sugar:** Sugar, sweets, cakes, sugar-sweetened beverages and added sugars only provide energy but no other nutrients. Sweets and sugar increase the risk of overweight/ obesity and lead to dental problems if eaten too often. Individuals who take too many sugary soft drinks and sugar-loaded sweets are more likely to become overweight and develop diabetes. Free sugar should be limited to 5% of total energy intake in children and 10% for adults.

3.5 Food safety

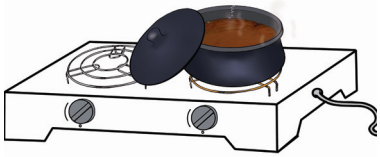
Food safety is a public-health priority for all countries regardless of development status. It should be addressed along the entire value chain i producing, storing, distributing and marketing food, by proper handling until the food is prepared and served. According to FAO and WHO, every day, people worldwide get sick from the food they eat. Such illnesses are known as 'foodborne disease.' They are caused by microorganisms and toxic chemicals. Most foodborne diseases are preventable through proper food handling. Below are five important tips from WHO. They are a core component of the FBDGs.

1. Stay clean

- Wash your hands with soap and water before handling food, and often during food preparation, to avoid disease-causing microorganisms leading to foodborne diseases
- Wash your hands with soap and water after going to the toilet
- Wash and sanitize all surfaces and equipment used for food preparation
- Protect kitchen areas and food from insects, pests and other animals

2. Separate raw and cooked foods

- Separate raw meat, poultry and seafoods such as fish from other foods to prevent the transfer of microorganisms which are a danger to your health
- If possible, use separate equipment and utensils such as knives and chopping boards for handling raw foods; if not possible, then clean knives and chopping boards thoroughly before using them
- Store foods in containers with lids to avoid contact between raw and cooked foods

3. Cook and reheat food thoroughly • Cook food thoroughly especially meat, poultry, eggs and seafoods; proper cooking (to a temperature of 70 °C [degrees centigrade]) can kill almost all microorganisms dangerous for your health • Reheat cooked leftover foods thoroughly	
4. Keep food at safe temperature • Cool down cooked foods as soon as possible in the refrigerator; or store in a cool dry place • Refrigerate all perishable foods • Do not store food too long even in the refrigerator	
5. Use safe water and raw materials • Use safe water or treat by boiling or with WaterGuard to make it safe • Select safe and wholesome foods • Wash fruits and vegetables especially if eaten raw • Check expiry dates when you buy processed packed foods; do not eat if expired	

Source: Five keys to safer food manual, WHO 2006

Photo credit: ILRI/Flickr.

SECTION 4:
FBDG KEY MESSAGES

Key message 1: Diversify your diet by selecting from at least 4 food groups in every meal and 6 food groups every day

What does a diverse variety of foods mean and how much should we eat?

- A varied/diverse diet means a plate with at least 4 food groups in every meal and 6 different food groups every day
- A varied diet should provide the required amount of nutrients necessary for good health
- Different food groups must be added to the main dish to vary a diet
- Pregnant and lactating women should eat one to two extra small meal or "snack" (extra food between meals) every day

Which of the pictures reflect diverse plate?

A. A plate with two food groups: injera, bread (cereal) + shiro (legume)	B. A plate with three food groups: injera, bread, (cereal) + shiro (legume) + kale/atikilt alicha (vegetable)
	
C. A plate with four food groups: injera, bread (cereal) + shiro (legume) + vegetables + cottage cheese	D. A plate with five food groups: injera, bread (cereal) + shiro (legume) + kale (vegetables) + egg (ASF group) + banana (fruit)
	
E. A plate with two food groups: maize porridge (cereal) + sauce (hot pepper and oil)	F. A plate with three food groups: spaghetti with tomato sauce (cereal) + tomato (vegetable) + oil
	

Box 3.3: The 6 food groups in Ethiopia's Food-Based Dietary Guidelines

1. Cereal, grains, white roots and tubers
2. Legumes
3. Nuts and oil seeds
4. Milk and dairy foods; meat, fish and egg
5. Fruits and vegetables
6. Fats and oils

How much should we eat from the cereal subgroup?

- One servings of cereals subgroup is equals to 1 medium size injera or 1 ½ pieces of bread.
- The minimum recommended intake of cereals for younger children (2–5years) is 2–3 servings per day. This increases to 2–4 servings per day for adolescents (6–18 years). For adults (19–64 years) and the elderly (65+ years), it is 3–4 servings per day.
- The minimum recommended intake of cereals for intermittent and continuous fasting is 3–4 servings per day.

Table 4.1: Minimum recommended number of servings of cereal based foods per day

	Servings per day			
	2–5 years	6–18 years	19–64 years	65+ years
Non-fasting	2–3	2–4	3–4	3–4
Intermittent fasting	*	3–4	3–4	3–4
Continuous fasting	*	3–4	3–4	3–4

*Not applicable

Commonly consumed cereals depicted in grams

1 medium-sized teff injera (only) = 310 g	1 medium-sized homemade bread = 100 g	1 medium-sized commercial bread = 110 g
		

Box 4.1 Food groups and variety of foods in brief

- Other than in pastoralist areas, the major Ethiopian diet is plant-based, consisting mainly of grains, root and tuber group. Depending on the food culture, the common foods we eat from this 1st group are injera, bread, kocho, and kolo.
- The 2nd food group is pulses and legumes such as peas, lentils used to prepare stews such as lentil stew and pea-flour stew – shiro wot – to which other food groups mentioned below are added.
- Nuts such as groundnuts in kolo served as a snack, and oilseeds such as sesame and lentils commonly used especially during fasting periods make the 3rd group.
- Besides the legume-based stews above, stews can be prepared from different types of meat (chicken, beef, fish) in the 4th group. Milk and yoghurt also belong to this group.
- Vegetables, prepared as stew or salad, and fruits such as bananas, oranges and avocados make the 5th group.
- Oil Fats and oils are added to stews and other foods to make them tasty. This comprises the 6th food group.
- Water is very vital for good health.

Draw from the food groups as recommended in the Food Guide, observing moderation, variety and balance. For good health, drink a minimum of eight large glasses of water daily, complemented with daily physical exercise.

Tips

- The more food groups you eat from, the better your health
    * Use the ‘food graphic’ to help you make healthy choices
    * Vary your food as much as possible per meal, during the day and across the week

Key message 2: Every day, eat 80–120 grams of legumes such as beans, chickpeas, peas or lentils

Why are legumes important and how much of them should we eat?

- Legumes such as beans, chickpeas and lentils are very good sources of proteins and other nutrients
- Consuming legumes lowers BMI, slows weight gain over time and decreases occurrence of CVD and T2DM

Tips

- Most legumes such as beans and peas contain anti-nutrients which makes them difficult to digest. These are eliminated or reduced by soaking, letting them to grow sprouts or boiling.
- Soaking overnight also reduces cooking time and saves you fuel
- When you eat grass peas (guaya), process them appropriately by well-known techniques such as soaking, roasting and dehulling

How much should we eat from the legume food subgroup?

- One servings of legume food subgroup is equivalent with 1 medium sized scoop of shiro stew.
- The minimum recommended intake of legumes for young children (2–5years) is 1 serving a day. This increases to 1–2 servings per day for adolescents (6–18years), adults (19–64 years) and the elderly (65+ years).
- The minimum recommended intake of legumes for intermittent fasting is 1–2 servings per day and 2–3 servings per day for continuous fasting.

Table 4.2: Minimum recommended daily servings of legumes per day

	Servings per day			
	2–5 years	6–18 years	19–64 years	65+ years
Non-fasting	1	1–2	1–2	1–2
Intermittent fasting	*	1–2	1–2	1–2
Continuous fasting	*	2–3	2–3	2–3

*Not applicable

Commonly consumed legumes depicted in grams

1 medium ladle shiro stew = 100 g	1 average adult handful (efign in Amharic) of roasted beans (qollo)=30 g	1 medium ladle lentil stew = 125 g	1 average adult handful (efign in Amharic) of germinated beans (beqolt) = 45 g
			

Key message 3: Eat 100–200 grams of various fruits and vegetables of different colours every day, such as bananas, papayas, kale, carrots and tomatoes

Why are fruits and vegetables important and how much of them should we eat?

- Fruits and vegetables are rich sources of micronutrients (vitamins, minerals, antioxidants) and dietary fibre, vital for your health.
- The amount of micronutrients in fruits and vegetables varies according to the type of vegetable or fruit
- Deep-coloured F&Vs such as orange-fleshed sweet potatoes, carrots, mangoes and papaya are excellent sources of pro-vitamin A carotenoids, needed for healthy vision and fighting infections.
- Dark green vegetables such as kale and Swiss chards provide folate and vitamin A.

Tips

Make fruits and vegetables part of your daily meal

- Choose fruits and vegetables that are fresh and in season
- Wash your fruits and vegetables with clean water
- Avoid overcooking vegetables; you lose vitamins
- Use and promote locally available underutilized and nutrient-dense foods

How much should we eat from the fruits subgroup?

- One servings of fruits food subgroup is equals to 1 medium banana or 1 medium mango.
- The minimum recommended intake of fruits for younger children (2–5years) is 1–2 servings per day. This increases to 1–2 servings per day for adolescents (6–18 years). The serving size for adults (19–64 years) increases to 2–3 servings per day. For the elderly (65+ years), it is 1–2 servings per day.

- The minimum recommended intake of fruits for intermittent and continuous fasting is 2–3 servings per day.

Table 4.3: Minimum recommended number of fruit servings per day

	Servings per day			
	2–5 years	6–18 years	19–64 years	65+ years
Non-fasting	1–2	1–2	2–3	1–2
Intermittent fasting	*	2–3	2–3	2–3
Continuous fasting	*	2–3	2–3	2–3

*Not applicable

Commonly consumed fruits depicted in grams

1 medium-sized banana = 150 g	1 medium-sized orange = 200 g	1 medium-sized avocado = 150 g	1 medium-sized mango = 250 g
			
1 medium-sized lemon = 35 g	1 medium-sized slice of papaya = 75 g	1 medium-sized slice of watermelon = 150 g	1 medium-sized slice of pineapple = 35 g
			
1 glass of homemade mixed fruit juice= 250 g			
			

How much should we eat from the vegetables subgroup?

- One servings of vegetables food subgroup is equals to 1 medium-sized scoop of cooked vegetables.

- The minimum recommended intake of vegetables for younger children (2–5 years) is 1 serving a day. This increases to 1–2 servings per day for adolescents (6–18 years) and for the elderly (65+ years). For adults (19–64 years), it increases to 2–3 servings per day.

- The minimum recommended intake of vegetables for intermittent and continuous fasting is 2–3 servings per day.

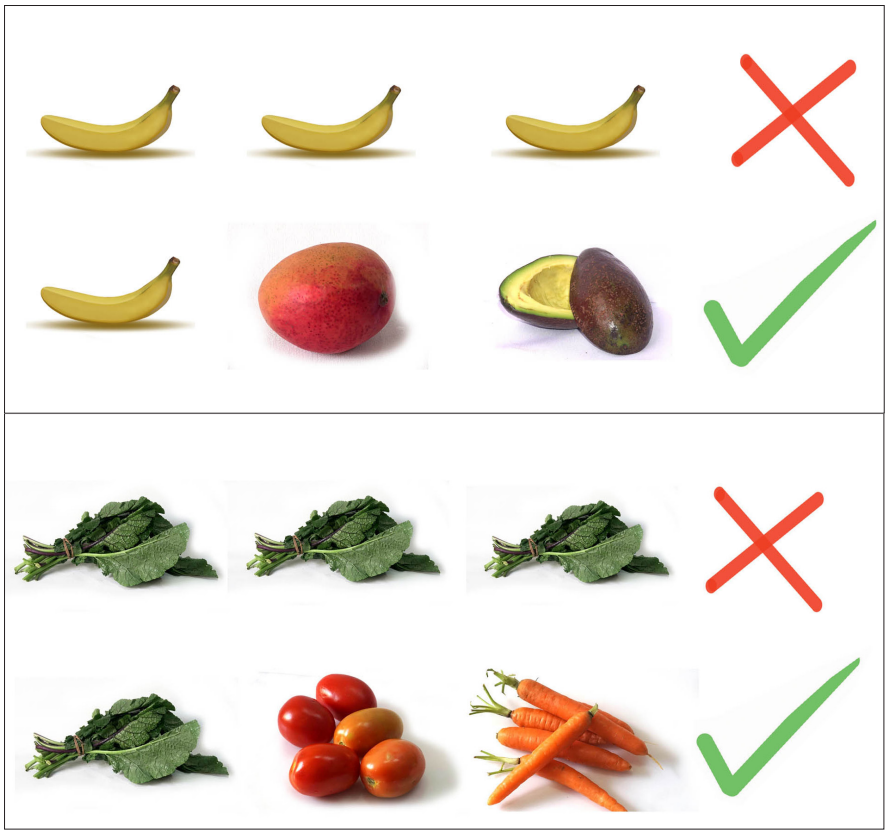
Table 4.4: Minimum recommended number of vegetable servings per day

	Servings per day			
	2–5 years	6–18 years	19–64 years	65+ years
Non-fasting	1	1–2	2–3	1–2
Intermittent fasting	*	2–3	2–3	2–3
Continuous fasting	*	2–3	2–3	2–3

*Not applicable

Commonly consumed vegetables depicted in grams

1 medium-sized spoon of salad = 35 g	1 medium-sized scoop of cooked kale = 35 g	1 medium-sized scoop of mixed cooked vegetables = 25 g
		



Key message 4: Diversify your diet with 10–20 grams of nuts and oilseeds such as groundnuts, and sunflower or sesame seeds

Why are nuts and oilseeds important and how much of them should we eat?

- Nuts and seeds such as groundnuts, Niger seeds and sesame seeds are good sources of protein, healthy fats, fibre, vitamins and minerals
- Nuts and seeds also contain healthy fats and other nutrients that protect us against heart disease.

Tips

- Adding nuts and seeds to kolo (roasted barley, wheat or other legumes) is excellent for your health
- Take nuts as a healthy snack instead of sweetened snacks
- Avoid mouldy nuts or oilseeds as they are not good for your health

Sunflower and flax seed juice with injera (yesuf/yetelba fitfit) are traditional foods good for health.

How much should we eat from the nuts and oilseeds group?

- One servings of nuts and oilseeds food subgroup is equals to 1 tablespoon of sunflower paste (suf fitfit).
- The minimum recommended intake of nuts and oilseeds for children 2–18 years old is 1–2 servings per day. This increases to 1–3 servings per day for adults (19–64 years) and the elderly (65 + years).
- The minimum recommended intake of nuts and oilseeds for intermittent fasting is 2–3 servings per day, and 2–6 servings per day for continuous fasting.

Table 4.5: Minimum recommended servings of nuts and oilseeds per day

	Servings per day			
	2–5 years	6–18 years	19–64 years	65+ years
Non-fasting	1–2	1–2	1–3	1–2
Intermittent fasting	*	2–3	2–3	2–3
Continuous fasting	*	2–6	2–6	2–6

*Not applicable

Commonly consumed nuts and oilseeds depicted in grams

1 average handful of groundnuts = 21	1 average handful of roasted sunflowers = 15 g	Sun flower juice mixed with pieces of injera (*Yesuf fetfet*) = 25 g	1 teaspoon of peanut butter = 10 g
			

Key message 5: Add animal-source foods such as eggs and meat (60 grams) and dairy foods (300–400 grams) to your meals ever yday

Why are animal-source foods important and how much of them should we eat?

- Animal-source foods such as meat, chicken and eggs are very good protein sources for building tissues and growth
- Organ meats such as liver, kidney and heart are rich sources of iron needed to combat anaemia
- Eggs are very good sources of complete protein and some B vitamins
- Milk (including goat and camel milk) and cheese are rich sources of calcium needed for bones and teeth

Tips

Adding a small amount of animal-source flesh foods to your meal is important

- A small amount of meat added to your stew (e.g. bozena shiro) enhances the nutritional benefits of other foods such as beans and peas
- Meat can sometimes have a lot of fat: cut off the fatty parts and remove chicken skin before cooking. Although fat is a source of energy, animal fat is mostly saturated, which is unhealthy for the heart.
- Avoid raw meat consumption. Consuming raw meat may not be safe and can cause food borne illness. Consume cooked meat instead.
- Drink fermented milk or boiled milk, and avoid drinking un-boiled milk which can contain dangerous bacteria

Drying meat (quanta) is common, and a good way of storing extra meat.

How much should we eat from the meat and egg group?

- One servings of meat and egg subgroup is equals to 1 egg or 1 portion of beef stew.
- The minimum recommended intake of meat and eggs for children 2–18 years old is 3–6 servings per week, rising to 4–9 servings per week for adults aged 19–64 years and 3–6 servings per week for the elderly (65+ years).
- The minimum recommended intake of meat and eggs for intermittent fasting is 0–9 servings per week.

Table 4.6: Minimum recommended servings of meat and eggs per week

	Servings per week			
	2–5 years	6–18 years	19–64 years	+65 years
Non-fasting	3–6	3–6	4–9	3–5
Intermittent Fasting	*	0–9	0–9	0–9
Continuous Fasting	*	0	0	0

*Not applicable

Commonly consumed meat and eggs depicted in grams

1 medium-sized ladle of meat stew = 85 g	1 medium-sized ladle of meat + kale stew = 50 g	1 medium sized fried fish = 300 g	1 medium-sized fish gulash = 80 g
			

1 medium-sized boiled egg = 50 g	2 medium-sized scrambled eggs = 50 g
	

How much should we eat from the dairy foods group?

- One servings of dairy foods subgroup is equals to 1 cup of fresh milk.
- The minimum recommended intake of dairy foods (such as milk and yoghurt) for young children (2–5 years) is 1 serving per day. This increase to 1–2 servings per day for adolescents (6–18 years), adults (19–64 years) and the elderly (65+ years old).
- The minimum recommended intake of dairy foods for intermittent fasting is 0–2 servings per day.

Table 4.7: Minimum recommended servings of dairy foods per day

	Servings per week			
	2–5 years	6–18 years	19–64 years	+65 years
Non-fasting	3–6	3–6	4–9	3–5
Intermittent Fasting	*	0–9	0–9	0–9
Continuous Fasting	*	0	0	0

*Not applicable

Commonly consumed dairy foods depicted in grams

1 glass of milk = 200 g	1 cup of yogurt = 350 g	1 Tablespoon of cottage cheese = 25 g
		

Key message 6: Drink 8–10 large glasses of clean water daily

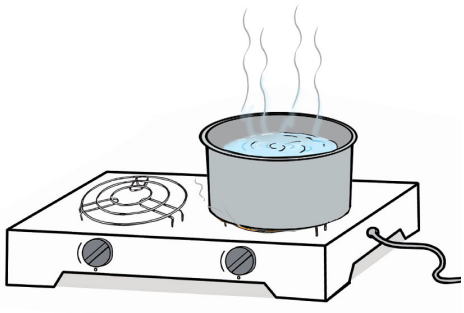
Why is water important and how much should we drink?

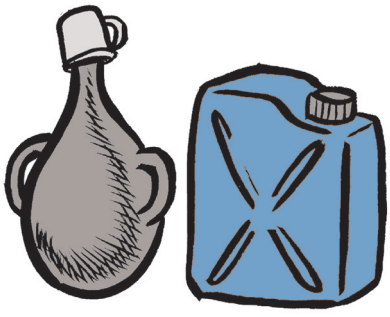
To stay healthy, you must drink enough water. We need a minimum of 8–10 large glasses of water daily for:

- Helping with digestion
- Carrying nutrients and oxygen to our cells
- Preventing constipation
- Normalizing blood pressure
- Cushioning joints
- Protecting organs and tissues

Tips

- Use water containers with covers to store water
- Before fetching water, wash water containers regularly using locally available cleaning materials such as detergents and ash
- Treat your water by boiling or using WaterGuard: this makes it safe for drinking





Key message 7: Be physically active for at least 30 minutes a day

Why is physical activity important?

- Whatever your age, scientific evidence shows that being physically active can help you lead a healthier and happier life
- People who exercise regularly have a lower risk of developing many long-term (chronic) conditions such as heart disease, type 2 diabetes, stroke and some cancers

Tips

- Be physically active at least 30 minutes daily
- When you exercise, drink an adequate amount of water
- Conducting household activities such as washing clothes and other chores count as physical activities

Key message 8: Take up to 15–20 grams of fats and oils per day

- Fats and oils are sources of energy
- Fats and oils are the most concentrated sources of energy (twice as much energy as starch or sugar)
- Fats contain fatty acids needed for growth and also help in the absorption of certain vitamins such as vitamin A

Tips

- For cooking, choose liquid vegetable oils (such as sunflower, soya bean or Niger seed oil)
- You can reduce your fat intake, especially fat from animal sources such as butter (saturated fat) and industrially produced solid cooking fats (trans-fat) by steaming or boiling food instead of frying
- Replacing butter or solid fat such as margarine with vegetable oils is better for your health

How much should we eat from the fat and oil group?

- One servings of dairy foods subgroup is equals to 1 Tablespoon of oil.
- The minimum recommended intake of fats and oils for children 2–18 years old is 1–2 servings per day. This increases to 2–3 servings per day for adults (19–64 years) and drops to 1–2 servings per day for the elderly (65+ years)
- The minimum recommended intake of fats and oils for intermittent and continuous fasting is 2–3 servings per day.

Table 4.7: Minimum servings of fats and oils per day

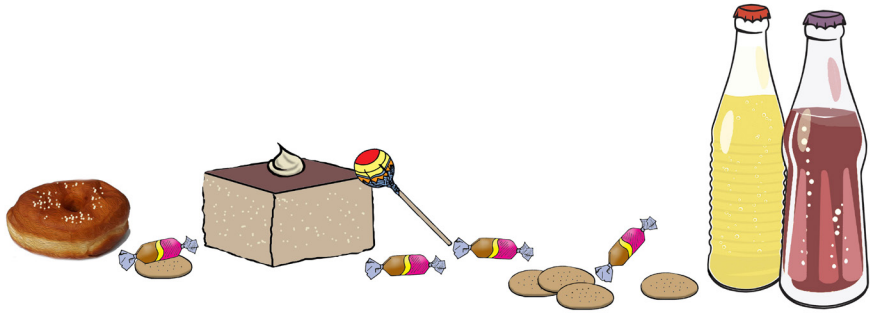
	Servings per day			
	2–5 years	6–18 years	19–64 years	65+ years
Non-fasting	1–2	1–2	2–3	1–2
Intermittent fasting	*	2–3	2–3	2–3
Continuous fasting	*	2–3	2–3	2–3

*Not applicable

Commonly consumed fats and oils depicted in grams

1 Tablespoon of oil = 10 g	1 Tablespoon of spiced butter = 15 g
	

Key message 9: Limit intake of sugar, sweets and soft drinks to below 30 grams per day

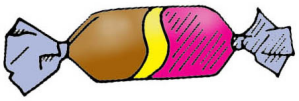


- Limiting sugar and sugar substitutes intake reduces the risk of overweight, obesity and tooth decay
- Besides the sugar added to coffee and tea, more sugar can be unknowingly taken in soft drinks, cakes, cookies and processed foods
    * For example, a single can or bottle of a sugar-sweetened soft drink has up to 40 grams (10 teaspoons) of added sugar

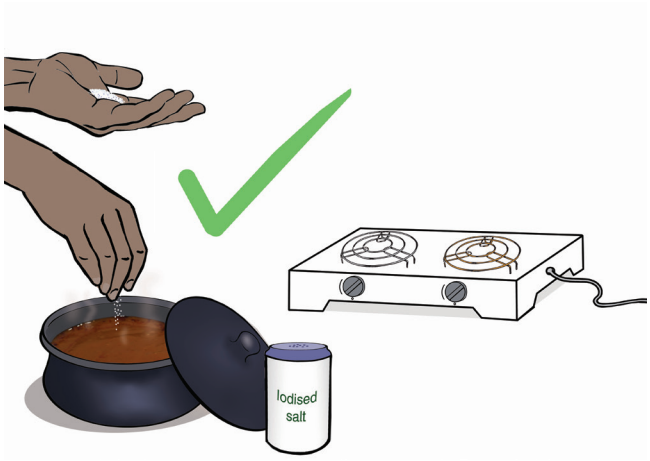
Tips

- Avoid adding sugar and sweeteners to milk and fruit juices
- Limit sugared foods like pastry and bakery products
- Take water instead of soft drinks: water is best and good for your health
- Do not add sugar or honey to your coffee and tea

Commonly consumed added sugar and sugar-sweetened beverage (SSB) depicted in grams

1 teaspoon of sugar = 4 g	1 medium-sized cake = 150 g	1 medium-sized glass of Coca Cola/soft drink = 340 g	1 medium-sized cookie = 9 g
			
1 medium-sized doughnut = 144 g	1 medium-sized sweet = 5 g	1 teaspoon of honey = 5 g	
			

Key message 10: Limit salt intake to below 5 grams per day



- Safeguard yourself from blood pressure by using less than 5 g (just under a teaspoon) of salt per day from all sources
- Remember! Some food items such as Ethiopian hot peppers, chilies and spices have a lot of salt added during processing, thereby counting towards salt consumption with the risk of daily intake rising above WHO recommendations

Tips

- When you process shiro, hot pepper and chilies, add only very small amount of salt
- When preparing your stew, reduce the salt: other ingredients such as hot pepper already have salt
- Use iodized salt
- Do not add salt to coffee
- Limit the consumption of salty snacks (such as packed crackers): it adds to your daily salt intake

1 pinch of salt = 2 g

Key message 11: Limit alcoholic drinks – both factory-processed and homemade – to no more than 2 glasses per week

- Drinking alcohol during pregnancy is discouraged because it affects your baby's health
    - Taking alcohol during pregnancy puts your baby at risk of premature birth, brain damage, impaired growth and development, congenital disabilities like heart defects, hearing or vision problems and low birth-weight (<2.5 kg at delivery)

Tips

- Even a small amount of alcohol intake during pregnancy can impair the health of both baby and mother

SECTION 5: IMPLEMENTATION, MONITORING, AND EVALUATION OF THE FBDGS

5.1 Pilot implementation and scaling up

Pilot implementation of the FBDGs will be done after the official launch of the FBDGs, mainly by food and nutrition implementing sectors, especially the Ministries of Health, Agriculture, Education, and other relevant ministries and stakeholders. The engagement of sector organizations and public and private stakeholders is important for implementation. Existing systems and structures, as well as professionals such as health extension workers, agricultural extension workers, school teachers, and the media are all important for the integration, promotion and broad adoption of the FBDGs for their intended purpose. In addition, FBDG messages can be distributed widely to the target population as brochures, posters and radio messages or television spots to reach target audiences. For effective implementation, deeper fore-planning is mandatory for the following core areas:

- Preparing a clear implementation strategy with lead and support sectors
- Planning for the endorsement of the FBDGs by the government
- Identifying and formulating an appropriate communication strategy
- Securing finance to support FBDG implementation (as a component of the Food and Nutrition Policy) across relevant sectors
- Ensuring the availability of geographically tailored and target-specific FBDG SBCC materials
- Making a joint plan for national launching and training of trainers using the FBDG toolkit
- Ensuring clear arrangements for step-down training by health and agricultural extension workers and other stakeholders for the message to reach all target audiences
- Planning for regional and national mass-media campaigns for coordinated and consistent dissemination of FBDG messages
- Planning for supportive supervision and follow-up
- Planning for documentation, lesson-sharing and scaling up

5.2 Monitoring and evaluation

FAO recommends that the process of implementing and disseminating FBDGs be assessed to ensure that the public messages and Food Guides are reaching the target audiences, and to know whether knowledge, attitudes and behaviour on healthy diets are changing positively. Given its national mandate for research, and as the lead for coordinating the development of Ethiopia's FBDGs, EPHI will work in close collaboration with the Ministries of Health, Agriculture, Education, research organizations, universities and other stakeholders to identify appropriate M&E indicators. A starting point is the validated women's diet diversity score tool for Ethiopia, a healthy eating index under development and the diet quality score tool which can be refined with FAO's technical support. Therefore, the pilot implementation phase will include identifying what is most appropriate for M&E. The lead and collaborating sectors will also be identified and further refined during the implementation planning stage.

Box 5: Tentative/preliminary M&E indicator	
Short-term indicators	Exposure to FBDG key messages, changes in knowledge and attitude of the population, health/agriculture professionals, decision-makers, and the food industry related to the key messages, associated graphics used in the FBDGs
Medium-term indicators	Increased availability and accessibility of recommended foods in key messages and dietary guidelines to set public standards as a base for developing or refining food, agriculture and nutrition policy and programs
Long-term/outcome indicators	Changes in food production, consumption trends and dietary intake, and resultant positive health outcomes

Source: http://www.fao.org/nutrition/education/food-dietary-Guidelines/background/evaluation/en/

5.3 Roles and responsibilities of key stakeholders in implementing the FBDGs

The government of Ethiopia supports FBDG implementation as an entry point to also simultaneously improve Ethiopia's food system to promote better diet and public health for all. The key action points mentioned below also server as suggestions to consider in developing (or revising), translating, implementing, monitoring and evaluating Ethiopia's FBDGs. Translating the FBDGs in this context includes menu development for different subpopulations, food cultures, agro-ecological zones, as well as into different languages. It is important that regional government policies try to find entry points for different policy instruments with the different sectors leveraging their unique entry points and roles as described here and elsewhere above.

Task	Suggested lead institution(s)	Suggested principles to consider
Defining the role of different stakeholders	Joint MoH, EPHI, MoA	Important to consult, agree on and document the roles of the various stakeholders in implementing the FBDGs. The suggested implementers are the Ministries of Health, Agriculture and Education; UN agencies; NGOs; civil society; religious institutes; and the media. These consultations will be within the framework of the Ethiopia Food Systems Transformation Pathway that calls for all food-system actors to identify their unique entry points to contribute to positive and forward momentum in food-system transformation.
Operationalizing the FBDGs	MoH, MoA, and MoE, with leadership by MoH	MoH develops menus with the involvement of dieticians together with EPHI. Since MoH disseminates health and agriculture education materials to different parts of the country, it is assumed they can translate into the various settings and languages needed. In this process, the role and engagement of the dieticians/nutritionists are very important for emphasis. The nutrition coordination office under the federal MoH will coordinate this process.
Training different stakeholders and implementation	MoH	It is strongly recommended that MoH and MoA lead the implementation, supervision and evaluation of the training programs based on the FBDGs. Incorporating FBDGs in the formal curricula in elementary, middle and higher education will be led by MoE. The process of training implementers and users should take a visionary approach and be linked to the Ethiopian Food System Transformation Pathway action plan. The involvement of academia, local media, UN agencies, NGOs and civil society is critical. It is also recommended that MoE not only incorporate nutrition literacy based on the FBDGs in curriculum development but also use the FBDGs to inform school feeding program menus. MoA will use FBDGs to inform the content and implementation of nutrition-sensitive interventions. It is a good opportunity to ensure that the nutrition education they conduct is informed by the FBDGs. Ministry of Industry also has an important role using the FBDGs to inform policies on food standards for manufacturing and import. Similarly, each ministry will have its own entry point for nuanced contribution to implementing the FBDGs. The media should also be guided by the FBDGs to promote food- and diet-related advertisements.

Task	Suggested lead institution(s)	Suggested principles to consider
Research, M&E on the effectiveness of FBDGs	EPHI	EPHI, EIAR, universities and international research organizations should be responsible for research and M&E. Periodic research to inform continuous revision is crucial. This should include M&E of the implementation process by different sectors and stakeholders, and related impacts. M&E outcomes should inform subsequent data needs to assess and assure the impact of food systems and inform FBDG revisions.
Follow-up data and continued evidence generation	EPHI	There are acknowledged data limitations in the current development process, such as the diet- and disease-related studies in Ethiopia. Data collection should already be incorporated into the EPHI workplan so that such data are available to inform the next iteration of the guidelines. It is important to establish or include variables in a cohort of sites to better understand the impact and shift of diets in Ethiopia.
Revising the FBDGs	EPHI	Use the same process as the original development, adapted to accommodate changes in data available and other aspects; to be undertaken every 5–6 years.
Healthy diets coalition	Joint leads: MoH, MOA; Co-lead: EPHI	An important coalition to make optimal use of the FBDGs will be formed comprising main stakeholders. UN agencies, NGOs, civil society and others will each identify their unique entry point to contribute to, and provide guidance on, the FBDGs: WFP on food items for humanitarian assistance and rehabilitation; FAO on agricultural interventions promoted; the Global Alliance for Improved Nutrition (GAIN) on private-sector activities promoted.
Emergency nutrition	MoH, EPHI, MoA	EPHI currently has the mandate of implementing emergency nutrition interventions. MoH and MoA will also plan emergency rehabilitation programs. EPHI will play a surveillance role as part of its broader research function, working closely with MoH. It is vital to incorporate key healthy-diet indicators into the existing system.

Task	Suggested lead institution(s)	Suggested principles to consider
Private sector		The private sector is a critical stakeholder in implementing the FBGDs. The FBDGs provide guidance on what is conducive/ the drivers to sustainably achieving healthy diets. The private sector has the role of translating this into healthy products and healthy marketing strategies that do not promote unhealthy consumption patterns for profit at the expense of health outcomes. FBDGs therefore provide guidance on entry points for the private sector in different parts of the food system to find their unique entry points to contribute to positive food-system transformation. The private sector can also moderate their marketing of unhealthy foods to children. Food-processing companies can strive for healthy options. In general, the manner in which the private sector interacts with the public must make it easier and more attractive to make healthier consumption decisions.
Consumer associations and civil society		Consumer associations should use the FBDGs to inform their advocacy efforts to demand food products and marketing behaviour that promote healthier eating patterns. Their consumer-awareness campaigns should also be grounded on the FBDGs. Similarly, civil society food advocacy work should be grounded on the FBDGs to promote improved access to healthy foods. Civil society has the important task of holding different stakeholders accountable for what they commit to deliver. The Ethiopia Food Systems Transformation Pathway is centred on healthy diets, with all food-system actors called upon to identify their unique entry points to contribute to positive food-system transformation. Civil society should hold all accountable to the commitments they make. The FBDGs are the golden thread along which the vision of the food-system transformation pathway is based and should also be the basis of holding to account all food actors from producers to consumers.
Donors	Ministry of Finance	Resource mobilization

Task	Suggested lead institution(s)	Suggested principles to consider
Standard authority and regulatory body		Food quality standards should be informed by FBDGs e.g. low sugar, low salt, low fat etc. They should counter false claims on unhealthy foods, e.g. the food has have vitamin A added but it is also sugar-laden: it is critical not to mask the sugar by riding on the vitamin A. A level of nutrient profiling is needed. The standards should not only apply to local but also imported products, must meet Ethiopia's standards based on the country's FBDGs.

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ANNEXES

Annex A: The 11 key messages for the public on Ethiopia's Food-Based Dietary Guidelines

1. Diversify your diet by selecting from at least 4 food groups in every meal and 6 food groups every day
2. Every day, eat 80–120 grams of legumes such as beans, chickpeas, peas or lentils
3. Eat 100–200 grams of various fruits and vegetables of different colours every day, such as bananas, papayas, kale, carrots and tomatoes
4. Diversify your diet with 10–20 grams of nuts and oilseeds such as groundnuts, and sunflower or sesame seeds
5. Add animal-source foods such as eggs and meat (60 grams) and dairy foods (300–400 grams) to your meals every day
6. Drink 8–10 large glasses of clean water every day
7. Be physically active for at least 30 minutes a day
8. Take up to 15–20 grams of fats and oils per day
9. Limit intake of sugar, sweets and soft drinks to below 30 grams per day
10. Limit salt intake to below 5 grams per day
11. Limit alcoholic drinks – both factory-processed and homemade – to no more than 2 glasses per week

Annex B

Annex B1: Recommended number of non-fasting food-group servings per day

Food group	Sentinel food	Serving size (kcal)	Equivalent amount in grams (measured)	In local measurement unit convenient for the public
Grains, roots and tubers	Injera, bread	300	Average from 310 g of injera and 150 g of bread = 230 g	1 medium-size injera or 1.5 pieces of bread
Pulses	Shiro stew	115	100 g (shiro)	1 medium sized scoop of stew
Nuts and seeds	Sunflower seeds	50	10–15 g (sunflower paste (suf fitfit))	1 teaspoon
Milk and dairy foods	Milk	90	200 g (milk)	1 cup
Meat and eggs	Egg and beef stew	65	Average from 50 g of eggs and 85 g of meat stew (67 g)	1 egg or 1 portion of beef stew
Fruits	A standard used by other countries' FBDGs	80	Average from 150 g of banana and 100 g of mangoes = 125 g	1 medium banana or 1 medium mango
Vegetables	A standard used by other countries' FBDGs	30	80 g (cooked vegetable)	1 medium-sized scoop
Oils and fats	Oil	130	8 g (oil)	1 tablespoon

Note: Sentinel foods are commonly consumed foods that are taken to represent each food group for the purpose of defining the serving size (in calories)

Annex B2: Recommended number of fasting food-group servings per day

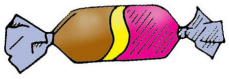
Men and women (19–64 years)	Age (years)	Recommended number of servings per day (except for meat and eggs)							
		Cereals	Pulses	Dairy	Fruits	Vegetables	Meat and, eggs (per week)	Nuts and seeds	Fats and oils
Intermittent fasting	19–64	3–4	1–2	0–2	2–3	2–3	0–9	2–3	2–3
Continuous fasting	19–64	3–4	2–3	0	2–3	2–3	0	2–6	2–3

Note: Children below 6 years, and pregnant and breastfeeding women should not fast. Fasting in this context means the fasting practised by Ethiopia's Christian community, especially by the Orthodox and Catholic churches. If adolescents and the elderly are fasting, a similar pattern can be followed in the place of ASFs. During continuous fasting, taking calcium and vitamin B12 supplements or fortified food is strongly recommended to meet the daily calcium and vitamin B12 requirements.

Annex B3: Common food items from each food group depicted in grams

Food group	Commonly consumed food items depicted in grams			
Grains, white roots and tubers	1 medium-sized teff injera (only) = 310 g	1 medium-sized homemade bread (only) = 100 g	1 medium-sized commercial bread=110 g	1 medium ladle of potato stew = 80 g
				
Legumes/pulses	1 medium ladle shiro stew = 100 g	1 average adult handful (efign in Amharic) of roasted bean (*qollo*) = 30 g	1 medium ladle lentil stew = 125 g	1 average adult hand-ful (efign in Amharic) of germinated beans = 45 g
				
Nuts and oilseeds	1 average adult handful of groundnuts = 25 g	1 average handful of roasted sunflower seeds = 15 g	1 time use sunflower paste to prepare suf fitfit =25 g	1 Tablepoon peanut butter = 10 g
				
Milk and dairy foods	1 glass of milk=200 g	1 cup of yoghurt = 350 g	1 tablespoon cottage cheese = 25 g	
				
Meat and eggs	1 medium ladle meat stew = 85 g	1 medium ladle meat + kale stew = 50 g	1 medium fried fish=300 g	1 medium ladle fish stew = 80 g
				
	1 medium-sized boiled egg = 50 g	2 medium-sized scrambled eggs = 50 g		
				

Food group	Commonly consumed food items depicted in grams			
Fruits	1 medium-sized sized banana = 150 g	1 medium-sized orange = 200 g	1 medium sized avocado = 150 g	1 medium-sized mango = 250 g
				
	1 medium-sized lemon = 35 g	1 medium-sized slice of papaya = 75 g	1 medium slice of watermelon =150 g	1 medium slice of pineapple = 35 g
				
	1 glass of homemade mixed fruit juice= 250 g			
				
Vegetables	1 medium-size spoon of salad = 35 g	1 medium-size scoop of cooked kale = 35 g	1 medium-size scoop of mixed cooked vegetable = 25 g	
				
Fats and oils	1 tablespoon oil = 10 g	1 tablespoon of spiced butter = 15 g		
				

Food group	Commonly consumed food items depicted in grams			
Added sugar and SSBs	1 teaspoonful sugar= 5 g	1 medium sized cake = 150 g	1 medium-sized glass of Coca Cola/soft drink = 340 g	1 medium-sized cookie = 10 g
				
	1 medium-sized doughnut = 145 g	1 medium-sized sweet = 5 g	1 teaspoon of honey = 5 g	
				
Salt	1 pinch = 2 g			
				
Alcohol	1 bottle of beer = 225 g	1 *birile tej* = 300 g	1 glass of wine = 220 g	1 glass of *tela* = 230 g
				
Potable water	1 glass of drinking water = 225 g	1 medium-sized bottle of drinking water = 500 g		
				

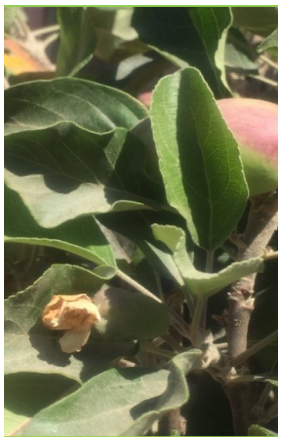
Home gardens

Home gardens are an important source of wholesome foods and can be cultivated by both rural and urban families. Gardening activities are crop production including fruits and vegetables; rearing small animals such as chickens, goats and sheep; and fish ponds. Home gardens are not restricted to homes and households. They can also be school gardens which expose students early to gardening and its benefits, or at community level as container-gardening when gardening space is sparse.

Photo credit: ILRI/Flickr.

- Home gardens produce such as F&V including herbs enables you to enjoy a low-cost, healthy diet from your very own vegetable garden while also offering an opportunity to make money by selling garden produce.
- Get advice from your nearest agriculture extension worker and start a home garden to grow your own fruits, vegetables and herbs which saves you money.
- Having your own garden also means your children will be interested in gardening from an early age.

Tend to your garden meticulously: always remember that just as your children need good food, drink, love and care, so does your home garden.



Fruit garden (apple, avocados and guava seedlings) planted in Bole Addis Kindergarten, Addis Ababa. An apple seedling planted July 2021 yielded its first fruit (right) in about a year. Lessons: 1) Good planting material and proper care and management are a must; 2) Schools are good places for gardening and children love observing the growing process: capture their interest in plants early.

Photo credit: Yewelsew Abebe (PhD).

Annex C: List of organizations involved in developing the FBDGs

- Ministry of Health, Nutrition case team
- Ethiopian Public Health Institute
- Ministry of Agriculture
- Ministry of Livestock and Fisheries
- Ministry of Education
- Ethiopian Agricultural Research Institute
- Wageningen University and Research
- CGIAR Research Program on Agriculture for Nutrition and Health
- International Food Policy Research Institute
- International Livestock Research Institute
- Food and Nutrition Society of Ethiopia
- Nutrition International
- United Nations agencies: FAO, UNICEF and WHO
- Alive & Thrive
- Save the Children
- Addis Ababa University
- Jimma University, School of Public Health
- Bahir Dar University
- Central Statistics Agency
- Hawassa University, Nutrition, Food Science & Technology
- Mekelle University, School of Public Health
- Faith-based organizations
- Ethiopian Broadcasting Corporation

Annex D: Background paper

Transforming Ethiopian Food Systems:

Better diet quality, prosperity, and sustainability in a changing climate
5 February 2021

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This background paper was developed through contributions from government and development partner researchers and programme implementers engaged in work in different components of the Ethiopian food system. We are grateful to them and their affiliated institutions, their dedication and time to contribute information based on available evidence on food systems in Ethiopia. In alphabetical order based on surname, the contributors are, Silvia Alonso, Solomon Aderu, Kaleab Baye, Tesfaye Hailu Bekele, Zewdie Bishaw, Inge D. Brouwer, Lynn R Brown, Namukolo Covic, Filippo Dibari, Tewodros Girma, Delia Grace, Ton Haverkort, Alemtsehay Sergawi, Sisay Sinamo, Mulugeta Teamir, Fesseha Tekele, Ursula Trübswasser. Details on affiliation of the contributors are given in the table below. The background paper development process was coordinated by Dr Namukolo Covic.

1. Introduction

In this background paper, we introduce the prevailing food system in Ethiopia to identify challenges and opportunities that can inform actions for a positive food system transformation that promotes attainment of healthier diets, improving nutrition and health while avoiding negative environmental impact. It is an evidence-informed description that identifies key challenges that will inform a joint High-Level Roundtable discussion of the Government of Ethiopia and the Global Panel on Agriculture and Food Systems for Nutrition. The outcome of the roundtable discussions will be used to further develop the background paper into the Ethiopian food systems position paper and roadmap that is being developed in a parallel but overlapping process. These documents will inform the Ethiopia Food Systems Summit 2021 (EFSS-2021) and subsequently the United Nations Food Systems Summit 2021 (UNFSS-2021) and the Nutrition for Growth Summit 2021 (N4G-2021).

Ethiopia has a rich policy environment relevant to food system transformation. Any recommended actions for food system transformation should be positioned within the given policy environment to facilitate actions being taken up within existing policy and programme frameworks. Moreover, there is much research relevant to food system transformation that has been done by different stakeholders. It is important to align efforts and take a holistic view to transforming Ethiopian food systems. For this reason, we take a nutrient-dense diet centered approach informed by the need to deliver better nutrition and health for Ethiopia's people, leveraging aligned partnerships across all tem transformation within the broader SDG focus on people, prosperity, partnerships, planet, and peace. We recognize the need to address environmental and planetary sustainability as important aspects on promoting prosperity and peace. The nutrient dense diet centered approach is informed by the following guiding principles,

1. The desired more nutrient-dense and healthy diets are used as inputs to inform what needs to change to deliver healthier diets for Ethiopian population through a sustainable food system,

2. Diversified nutritious diets are accessible and affordable to the majority of the vulnerable populations equitably and inform the outcomes of food system transformation that ensure that trade-offs are avoided;

3. Environmental sustainability and resilience are promoted across the entire food system from production to consumption;

4. The required dietary patterns, food safety, environmental sustainability, and resilience are used to monitor progress from production to consumption;

5. Economic development and poverty reduction through the agriculture sector promotes the desired food system transformation in a sustainable manner.

6. Effective partnership is promoted with local and international donors, development partners, private sectors, research institutes and academia and the community that have a stake in food systems transformation.

7. Government works with all stakeholders to create an enabling, peaceful and inclusive environment for food systems transformation.

The objectives of this background paper are therefore, to synthesize the available evidence to inform the required food system transformation in Ethiopia. The information will be used to 1) inform a High- Level Roundtable discussion between the Government of Ethiopia and the Global Panel on Agriculture and Food Systems for Nutrition; 2) develop an Ethiopia Food System Position Paper, 3) raise issues that should be included for the Ethiopian Food System Summit-2021 (EFSS-2021), the United Nations Food System Summit-2021 (UNFSS-2021) Dialogues for which game changing actions will be suggested, and 3) contribute to informing a food system roadmap being developed for Ethiopia.

2. Diets, health, and environment: What are the challenges Ethiopia faces?

In Ethiopia, while much progress has been made on increasing staple cereal production, productivity levels are still very low, and diversification to provide more nutrients dense foods like fruits and vegetables has been very limited. Ethiopia Demographic and Health Surveys (EDHS) show that some progress has been made to reduce undernutrition in the country. The prevalence of chronic malnutrition (stunting) has decreased from 58% to 37% between 2000 and 2019 (CSA & ICF, 2016; EPHI & ICF, 2019). The proportion of underweight children declined from 41% to 21% and wasting decreased from 12% to 7% during the same period (EPHI & ICF, 2019). However, Ethiopia's burden of undernutrition and micronutrient deficiencies are still among the highest in Sub Saharan Africa. The 2016 national micronutrient survey also indicated that anemia,

zinc, vitamin A, folate, and vitamin B12 deficiencies are at the level of public health concern. More than half of children at the age of 6-59 months (57%) and 24% of women aged 15-49 years were anemic (CSA & ICF, 2016). In addition to macronutrient and micronutrient deficiencies, Ethiopia is also facing increasing overweight, obesity and diet related non- communicable diseases (diabetes and cardiovascular diseases) that are emerging challenges particularly among the urban population. Twenty-two percent of women aged 15-49 are thin (BMI<18.5), while 8% are overweight or obese (CSA & ICF 2016) but higher in urban settings. Poor diets are in part to blame for this situation of multiple forms of malnutrition.

Dietary guidelines, irrespective of settings, have consistently recommended the consumption of a diverse diet to ensure optimal health and wellbeing. **According to the 2016 EDHS survey (CSA & ICF, 2016), only 12.8% of children 6-23 months of age met the Minimum Dietary Diversity of 5 food groups out of eight.** Although this represents an increase of 8 percentage points from 2011 figures (4.4%), the pace of progress is very slow and favored only the highest wealth quintile (Baye, 2021). Also of great concern is the limited consumption of nutrient-dense foods from groups like animal source foods (ASF), fruits and vegetables. Such diets devoid of ASF, fruits and vegetables have been associated with poor child growth, micronutrient deficiencies, compromised immunity, and poor cognitive outcomes. Besides other socio-economic factors, cultural and religious practices have often been given as reasons for limiting consumption of a nutrient dense diet by children in Ethiopia. But recent evidence has reflected that children's diets were of low quality, irrespective of the diverse Ethiopian agroecology. Largely pastoral regions of Afar and Somali had a similarly low MDD prevalence (<3%) to the agrarian regions of Amhara (CSA & ICF, 2016), suggesting that the drivers of diet quality are complex and may reflect several factors. The prevalence of MDD ranged between 2.6 % in Afar and 36.5% in Addis Ababa.

Although a minimum dietary diversity for women (MDDW) indicator has been developed, this has not yet been captured in routine nationally representative surveys like the DHS in Ethiopia. However, the endline NNP survey used it and reported that <20% of women met the MDDW (EPHI, 2015). The most recent synthesis of evidence from different parts of the country confirmed this low MDDW prevalence (Baye & Hirvonen, 2020). Similar to findings in children's diet, nutrient-dense foods like ASF, fruits and vegetables are still missing in the diet of women. **For example, only 2.4% of the adult population meets the WHO recommendation of five serving of fruits and vegetables per day (Baye & Hirvonen, 2020).** In contrast, salt consumption is above the WHO threshold of 5 g/day in every region of Ethiopia. The national average salt intake is 8.2 g/day (Challa et al., 2017). The low diversity of the diet, food safety concerns, and the unhealthy trends of salt and sugar intake, could explain the increasing trend in non- communicable diseases, on top of the already high prevalence of communicable diseases, that are stretching the health system. Indeed, about 5% of the adult population is diabetic and close to a third of the Ethiopian adult population have raised blood pressure. From 2009 to 2019 alone, cause of death and disability related to dietary risk factors have increased by 18% (GBD, 2019).

Foodborne diseases are the most direct health effect of unsafe food systems. Unsafe food causes billions of illnesses each year posing a health burden comparable to that of malaria (Havelaar et al, 2010). Most of this global burden (98%) affects developing countries and

children less than five years of age (40%). They also result in high costs to health systems and patients (Jaffee et al, 2019). Food systemsthat fail to offer safe food face barriers to accessing international markets and undermine the potential for economic development.

Although nutrition literacy is an important driver of dietary choices, consumer behavior is also influenced by the food environment, which is determined by the purchasing power of consumers, their income, the accessibility, and affordability of nutrient-dense foods. One in four (24.8 %) households in Ethiopia fall below the food poverty line and 25.5 % of individuals are food insecure. The proportion of households who have inadequate caloric consumption (<2550 Kcals per adult equivalent per day) constitutes 31% (24 % of urban areas and 33% of rural areas). Consequently, starchy staples that are the cheapest source of energy contribute the highest share of the energy intake (71.4 %). More expensive, but nutrient-dense foods like ASF, fruits and vegetables are thus rarely consumed. For example, the per capita milk consumption of Ethiopian adults is 16.6 kg per year, 7.5 kg of meat per year and vegetable consumption per capita stands at 50.2 kg per year. These figures are considered very low, even by Sub- Saharan African standards.

The unaffordability of nutrient-dense foods is a significant barrier to improving diet quality. According to the recent cost of the diet estimates for Ethiopia, three out of four Ethiopians cannot afford the minimum cost of a nutritious diet. A nutritious diet costs more than four times the cost of an energy only sufficient diet for a family of five, assuming two adults and three children (i.e., 111 birr versus 26 birr). This figure is even more striking for areas like the Somali region, where the minimum nutritious diet costs significantly higher (144 ETB) than the national average (111 ETB). **The change in prices by food groups seen in the last decade also illustrates that the prices of nutrient-dense foods have increased above general inflation figures, whereas the price of cereals remained stable, and those of oils and sugar declined (Bachewe et al., 2017).** This trend in prices is likely to continue favoring a predominantly starchy diet, but also could encourage increased consumption of sugar and oils, moving Ethiopia further away from the needed healthy diet. The price trends are also reminders that due considerations should be given when implementing fiscal policies and incentives (e.g., sugar/oil subsidies) that can have unintended consequences on diet and health.

Noteworthy is the clear picture that emerges when putting together data related to diet, prices, household incomes, and the food supply. Analyzing the food supply data of Ethiopia between 2011-15, Baye et al (2019) has shown that overall agricultural production has increased substantially, reaching a national production level of 3500 kcal/capita. However, this increase has come at the cost of more nutrient-dense foods, as reflected by the decreasing diversity of the food groups produced. Consequently, these **cereal-dominated, yield-focused agricultural policies might have contributed to the observed prices and the monotonous diets dominated by cereals.**

With one of the lowest per capita consumption of animal source food in the world (Shapiro et al., 2015), affected in part by traditional and religious dietary practices, the most acceptable sources of protein and micronutrients for millions of Ethiopians are legume crops. Despite the important role legume crops could play, they have received little or no attention in the country's agricultural

development policies and strategies. **Food system transformation processes that target improving diet quality must consider actions needed to increase production diversification, must include production and productivity of legume crops.** Recent developments elsewhere in Africa where biofortified high iron bean varieties have been developed offer opportunities for Ethiopia.

Given the above challenges, there is need for the food system to transform in such a way that,

1. productivity of staple and other food crops increases sustainably,
2. diversification increases to produce more accessible and affordable nutrient dense fruits andvegetables;
3. greater attention is given to developing staple crop varieties that are nutrient enriched.
4. availability and affordability of animal source foods increases through more productive andenvironmentally sustainable regenerative farming practices,
5. the food system delivers safe food in markets and
6. that consumption patterns driven by cultural and religious practices (e.g. limiting the intake of nutritious products) are addressed especially at critical times like the first 1000 days of a child's life, which includes pregnant and lactating mothers;
7. food system actions are taken to prevent the rise in overweight, obesity and diet related non-communicable diseases.

3. Why food systems must undergo a process of transition to deliver sustainable, people centered, environmentally friendly and healthy diets

Current food systems are no longer fit for purpose. With one quarter of the world's population unable to access nutrient rich and sufficient food, and a real risk of crossing multiple planetary boundaries due to agriculture and food systems, these food systems urgently need to undergo a process of transformation (Global Panel, 2020).

The Ethiopian food system will and is already transforming. With foreseeable rise in incomes, rapid urbanization, the development of agro-processing industries, and the significant increase of the Ethiopian population, the food system is transforming, but this transformation should be shaped in a way that supports the adoption of people-centered and healthy diets. The changing demography and rising incomes will increase demand for nutritious foods, but the arable land is not going to increase to meet this demand. There will need to be a shift to increase overall systems efficiency, and available natural resource would thus need to be restored, preserved, and used optimally to support sustainable healthy diets. This would mean using regenerative farming practices that preserve/restore soil fertility and using less chemicals (e.g., pesticides). The production should be diversified, and reforestation initiatives should reserve a great share of

new plantings for fruit-trees. Effective ways of increasing livestock production, without leading to substantial increases in GHGs emissions should also be sought. The agro-processing sector that is growing would need to be shaped in a way that contributes to making nutritious and healthy foods accessible and affordable. The role of smallholder farmers should be protected throughout this transformation. There is also the potential to use approaches involving sustainable intensification, and technology innovation.

Ethiopia must therefore produce a more nutrient dense food basket for its population and increase the availability and affordability of nutrient dense foods. And it must do so while containing the environmental impact of agriculture. An assessment conducted in 2011 by Community Development Research for the Global Methane Initiative indicates that, while CO2 and methane emissions (two of the most important greenhouse gases (GHG)) in Ethiopia have been generally very low, both types of emissions have been growing over the past decades, in parallel to the country's economic growth. **With the prospect of Ethiopia's agricultural sector expanding to deliver a more diverse and nutrient-rich food basket, it is to be expected that the contribution of the agricultural sector to the country's GHG emissions will grow.** The Government of Ethiopia has initiated a Climate-Resilient Green economy initiative (CRGE, 2011) that identifies opportunities to reduce the country's GHG emissions by 64% in 2030 compared to a business-as-usual scenario. This includes improvements in the agricultural sector. Because of the current low productivity levels for crops and livestock, the GHG emissions per unit of product is higher than with more efficient production systems. Therefore, by **increasing farm productivity, promoting adoption of more sustainable regenerative farming practices, and reducing food losses, GHG emissions growth could be curbed or at least contained, within the Ethiopian context.** For example, a recent assessment by FAO (2017) identified improved genetics and feeding as key strategies in the dairy sector to curb its environmental footprint, by reducing methane emissions and increasing production at farm level. The effects of climate change and environmental degradation are very visible in Ethiopia through recurrent extreme events of droughts and floods. Land and soil degradation is a challenge due to high levels of deforestation. Just increasing productivity is not enough, it should be done while seeking to improve production practices to become more regenerative to mitigate against land, soil, water, and forest degradation. It is important that the food systems transformation needed takes a holistic view and considers the above realities.

Ensuring the availability, accessibility, safety, and quality of nutritious foods at all times for all citizens is a prerequisite for the creation of a productive workforce, longevity of life, improved livelihoods and innovative capacity that would lead to fast economic, social, and sustainable development of a nation. This can be realized when citizens across all ages of the life cycle enjoy a healthy life, have better knowledge of nutrient rich foods, practice improved utilization of foods, ensure food safety and quality along the food value chain, avoid food and nutrient losses, develop food and nutrition emergency preparedness, and increase resilience capacity (FNP 2018). Food system wide behavior change is needed to foster changes that are helpful.

The Government of Ethiopia has been implementing coordinated and fundamental economic reform programs over the past decades. These economic reforms have resulted in encouraging social and macroeconomic developments. Ensuring food and nutrition security can play a

significant role in sustaining the gains from the economic reforms and putting the economy on a solid foundation. To further speed up the overall economic development of the country that depends heavily on agriculture, optimal utilization of food system related policies and implementation of cost-effective food and nutrition security interventions across the food systems in a sustainable manner are fundamental (FNP, 2018).

Foodborne disease (FBD) due to poor food safety needs some attention. Diarrheal diseases represent 93% of the total cases of FBD, 73% of the deaths and 70% of the FBD DALY burden, (Havelaar et al., 2010). Limited information is available on the cost of diarrheal disease in Ethiopia. A study focusing on infants from 0 to 59 months, found that out of pocket direct medical expenses for outpatient treatment of diarrhea were $5, mostly on medication (Memire et al., 2017). Severe diarrhea accounted for 9.1% of the diarrhea cases and the mean in-patient cost for this was $79 (mostly on medicines, supplies and bed-charge). The mean associated direct non-medical costs (mainly transport costs) were $2 for outpatient care and $20 for inpatient care. These are largely consistent with limited literature from other parts of Africa. Animal source foods and vegetables, the most nutritious and recommended foods, are responsible for most of the FBD burden. The extensive FBD described is an important reason why transforming food systems must have a food safety perspective.

Partnership for positive food environment

To deliver better nutrition and health requires effective partnership and investing in supporting the food industry (i.e., from production to retailing) on adoption of good food safety practices and promoting enabling policy environments that supports the private sector (largely formed of smallholder farmers and small and medium enterprises) to deliver on healthy foods. Strengthening food safety requires efforts on various fronts: (i) generate credible country-specific evidence on FBD and its impact in the country, (ii) develop risk-based country-specific strategies to address food safety challenges, (iii) support private and public food industry with training and technology, (iv) promote a supportive policy environment that puts healthy foods and food safety at the forefront of food systems development.

Because of the intergenerational impact of malnutrition, the food choices that adolescents make have an impact on the nutrition status of the next generation not only through their nutrition status but also through habitual choices they may make for their own families later in life. Recent assessments of urban food environments around schools in Addis Ababa suggest that food environments in and around schools are not conducive for healthy food choices (Trübswasser, 2020). Advertising and promotion of food and drink is mostly limited to sugar-sweetened beverages. The same could be said about the food environments of the communities within which these schools are embedded. Availability of foods and drinks within school cafeterias is also not in line with healthy diets. While vegetables are offered as part of some cooked meals, fruits are entirely missing, and sugar-sweetened beverages were available in most school settings (Trübswasser, 2020a). **Food system transformation must therefore aim to create food environments that are conducive to making healthy food choices.** Positive food environments can help promote the better food choices recommended in line with FBDGs.

4. Sustainable healthier diets as an entry point for food system transformation in Ethiopia

More sustainable healthier diets should be a key outcome area of food system transformation. **Food Based Dietary Guidelines (FBDGs) are recognized globally as tools that can help public and individual choices on positive consumption patterns that can improve nutrition and health outcomes.**

The FBDGs currently under development by the Ethiopian Public Health Institute (EPHI) define what a healthy diet in the Ethiopian context should be. They can serve to inform the minimum dietary standards that can promote improved consumption patterns and provide direction on the food system transformation needed to address diet quality effectively. The FBDGs are based on generic WHO principles for healthy diets translated using Ethiopia specific evidence to promote health by preventing all forms of malnutrition. The Ethiopian FBDGs have the following two main objectives: 1) Provide dietary recommendations for Ethiopians two years and older for increased diet quality, including diversity and food safety for optimal health; and 2) Promote broad food system actions supporting diet quality being sensitive to sustainability. Comparing present diets in Ethiopia with these guidelines, confirms both the poor state of diet quality in the country but also the need for the food system including the agriculture sector and food industry to provide a more nutrient dense food basket that is safe, accessible, affordable, and desirable to consumers. The guidelines also recognize the need for sustainability and resilience to be considered as well as the need for contextualization to sub-national settings. The first contextualization process for pastoralist settings is planned during 2021. Progress on consumption patterns in line with the FBDGs could, therefore, be used to monitor progress on food system transformation for impact on diet quality under different sub-national settings.

Using the FBDGs to guide the monitoring of Ethiopia's food system transformation could be possible because the FBDGs development process also includes development of a Healthy Eating Index (Bekele et al, 2020). In a parallel process a food systems transformation profile is being developed that will recommend indicators that could be used to monitor progress on food system transformation from a diet quality and sustainability perspective. When the roadmap and position paper for food system transformation for Ethiopia are developed the above considerations must be used to promote synergy and that diet quality is used not only as an input to inform the needed transformation but also as an outcome by which positive transformation could be monitored to direct progress over time.

The production diversity and regenerative agricultural practices that need to be adopted as part of the food system transformation can also be monitored in their ability to support the needed consumption patterns and sustainably as indicated by the FBDGs and the Ethiopia food system profile. This monitoring needs to include environmental and climate impact. Similarly, developments in the food industry could also be monitored based on their impact on consumption patterns. For example, based on the evidence generated on sugar consumption, **FBDGs could be used to set standards on sugar content of foods and drinks available or advertised within and around schools and to the public at large, to improve sugar consumption at population and individual levels.**

Therefore, taking a sustainable healthy diet centered approach can provide a holistic view from which to direct and monitor the foods system transformation process.

5. Ethiopia's policy environment in relation to food system transformation

A recent review on Ethiopian policies (Trübswasser 2020b) found a rich nutrition policy landscape in Ethiopia with malnutrition being addressed in multi-sectoral policy documents through nutrition-specific, nutrition-sensitive and infrastructure strategies. The policy instruments target different elements of the food system and related challenges and present an enabling environment that can be leveraged to foster positive food system transformation. In this section we describe selected policy instruments and the overarching objectives they address in relation to food system transformation.

The Government of Ethiopia has developed several policy and program instruments to operationalize its vision of ending stunting by 2030. **The National Food and Nutrition Policy,** that was passed into law in November 2018, guides the multi-sectoral and multi-stakeholder approach needed to address malnutrition and provides a policy framework for multi-sectoral governance of food and nutrition activities in the country (FNP, 2018). It also provides for the establishment of a Food and Nutrition Governing Body and an institutional arrangement (structure) from Federal to Kebele (village) levels with the leadership of the highest government decision makers at the different levels to govern and coordinate the implementation of the Food and Nutrition Policy.

The **National Food and Nutrition Strategy,** currently being finalized, is informed by the 10-year strategic plan outlined in the policy and defines key actions to be undertaken by the different sectors including agriculture. The strategy builds on the **National Nutrition Program (NNP II)**, which was signed by 10 State Ministers of relevant sectors (FDRE, 2016). In addition to the above policy frameworks the government has also developed a **Nutrition Sensitive Agriculture Strategy** (FDRE, 2016), **School Health and Nutrition Program, School Feeding Program, One WASH** and **Productive Safety Net Program V** (2021–2025) (MoA, 2014). Table 5.1 provides a list of policy instruments and their overarching goals as they relate to food system transformation. In 2015 the government also unveiled the Seqota Declaration which is an innovative government of Ethiopia commitment that serves as an accelerator for high impact nutrition-specific, nutrition-sensitive and infrastructure interventions to fast-track progress towards national, continental, and global nutrition targets (FDRE, 2016).

The Seqota Declaration (2015–2030), as a Government commitment to end stunting in children under two years by 2030, offers an opportunity to implement synergistic actions across different sectors. The Seqota Declaration's 15-year roadmap is divided into three phases each spanning a period of five years (Figure 5.1). The *innovation phase* (2016–2020) focused on the implementation of priority intervention packages that are being monitored and evaluated to generate learnings and evidence to inform the design and implementation of the *expansion phase* (2021–2025). The Expansion phase will reach more vulnerable woredas across the country before a *national scale-up phase* (2026–2030). The National scale up involves full-blown implementation of evidence-based, innovative, and sustainable multi-sectoral interventions. Given the above information,

the Seqota Declaration provides a valuable platform within which to address positive food system transformation that can provide sustainable healthy diets affordably with food safety, and environmental sustainability consideration. Implementation of the Foodand Nutrition Strategy is accelerated through the Seqota Declaration.

The **National Nutrition Sensitive Agriculture Strategy** (NSAS 2016–2020) targets different action areas to ensure accessibility of a diverse nutrient dense food basket for better diets with equity and sustainability considerations. The strategic objectives of the NSAS include 1) integrating nutrition into agriculture and livestock policies, strategies, programmes and work plans at all levels; 2) establishing and strengthening institutional and organizational structures and capacity responsible for planning and implementing nutrition sensitive agriculture; 3) increasing year-round availability, access and consumption of diverse, safe and nutritious foods of both plant and animal origin including nutritionally enriched biofortified staple crops; 4) enhancing resilience of vulnerable agrarian, agro-pastoral and pastoral households and communities prone to climate change and moisture stress; 5) ensuring women and youth empowerment as well as, gender equality in the actions that are taken, and 6) establishing and strengthening multisectorial coordination within the agriculture sectors and with signatories of NNP and other development partners. It is very clear that the given action areas address the challenges that have been alluded to in other sections above. It is therefore important that food system transformation takes these policy instruments into consideration and that the roadmap and position paper developed are structured to increase synergy to accelerate progress across the policy instruments that are presented in Figure 5.1.

Table 5.1 Selected Ethiopian policies and the overarching objectives with respect to food system transformation.

Policy/policy instrument	Overarching objective
National Nutrition Program (NNP II) 2016–2020	Ending malnutrition by 2030 through multisectoral coordination and collaboration with Agriculture being a key sector
National Nutrition Sensitive Agriculture Strategy (NNSAS) 2016–20	Improving nutritional status of children and women by increasing the quantity and quality of food available, accessible, and affordable and promoting utilization of diverse, nutritious, and safe foods for all Ethiopians at all times
Growth and Transformation Plan II (GTP II) 2015/16–2020	Economic growth and transformation leveraging agriculture as a key focus area and with nutrition stated a key outcome area
Agricultural Growth Program (AGP II) 2015–2020	Ensuring nutrition security through community participation
Productive Safety Net Program phase IV (PSNP IV) 2014	Social protection with resilience consideration for food security and poverty alleviation
Seqota Declaration	A government commitment to accelerate the ending of hunger and malnutrition by 2030 using innovative approaches and food systems considerations, targeting vulnerable rural & recently also urban settings

Policy/policy instrument	Overarching objective
National Horticulture Development and Marketing Strategy 2017	Addressing gaps towards developing market value chains for fruit and vegetable production and consumption. This is currently available only in Amharic but is an important policy instrument
Food and Nutrition Policy 2019	Attain optimal nutritional status at all stages of life a level that is consistent with a high quality of life, productivity, and longevity of life.
Livestock Master Plan 2015	Presents investment interventions needed in the livestock sector that could help to meet the targets of the Growth and Transformation Plan II (2015–2020) of Ethiopia by improving productivity of the livestock sector and total production in the poultry, red meat, milk, and crossbred dairy systems. These investments are expected to reduce poverty among livestock-keeping households and increase the contribution of livestock to agriculture GDP. By increasing productivity, they will also reduce the environmental footprint of livestock farming per unit of produce.

Within the above policy environment, the Ministry of Agriculture is implementing nutrition sensitive agriculture interventions aimed at accelerating the end of hunger and malnutrition. Various agricultural strategies and packages have been revised to incorporate nutrition sensitive interventions that include a, fruit and vegetable strategy, crop development strategy, biofortification, livestock packages etc. Nutrition sensitive agriculture core competencies have been incorporated into the curriculum of higher learning institutions and ATVETC and efforts were taken to establish nutrition structures at all levels, but this has not been very effective. At the federal level, where there has been greater success, the nutrition case team at the Ministry of Agriculture has been upgraded to a Food and Nutrition Coordination Office directly accountable to the Minister of Agriculture. To address implementation capacity, a nutrition sensitive agriculture (NSA) training manual was developed, and various training and awareness creation forums have been conducted from federal to woreda (district) levels.

Other efforts include the preparation of nutrition sensitive agriculture documents including the **Nutrition Sensitive Agriculture strategy** and manual, promotion of the strategy and basic nutrition concepts as well as the implementation of NSA activities. In Seqota Declaration woredas the ministry has designed and constructed nutrition corners in selected model FTCs as a full-fledged training center consisting of, backyard gardening for NDC, livestock production units, rooms for cooking demonstration, display and training as well as post-harvest technology unit to introduce appropriate technologies to store, process and transport ND agricultural products.

The ongoing efforts incorporate nutrition into sectorial programs and work plans. There has been introduction of some nutrient dense crops in backyards and irrigation fields (fruits and vegetables, nutrient dense pulses, and cereals, biofortified crops such as, quality protein maize (QPM), orange

fleshed sweet potato (OFSP) and Iron rich beans. Livestock production like dairy, meat and egg production have mainly focused on pregnant and lactating women (PLW) and households with children less than two years. The lessons learned will inform direction on the needed food system transformation.

Other Policy tools that could be considered for food supply are related to providing agricultural inputs, services, and technologies, expanding social cash transfers and education and information interventions to promote the production and consumption of diverse foods and strengthen the capacity of agriculture extension workers in nutrition-sensitive approaches.

On the prevailing food environment, improving food safety is an important objective of Ethiopian policy documents. This includes reinforcing regulations to ensure that food is produced, processed, or fortified locally with safety considerations by the food industry. **The Food and Nutrition Policy calls for implementing a legal framework for ensuring the safety and quality of foods throughout the value chain.** The Ethiopian Food and Drug Administration has been issuing regulations and directives to improve the quality and safety of food products in general, but also specific for infant formula, complementary foods, and food supplements. However, enforcement of these regulations should be strengthened. (NNPII) Regulatory instruments addressing other components of the food environment have been proposed only in a few policy documents. **The NNP II and the NCD Action Plan called for regulatory approaches to address unhealthy lifestyles and diets** (replacing trans-fats and saturated fats, reducing salt and sugar), through production and marketing of healthy foods while minimizing the effect of unhealthy marketing, front-of package labeling of sugar and salt and taxation of sugar- sweetened beverages. **An Excise Tax Directive in 2020 introduced higher taxes for foods high in saturated fats, sugar, and salt. The School Health Program suggested prohibiting the promotion of soft drinks, sweets, and foods (School Health Program, 2017).**

The school food environment is an important food system intervention entry point for any country. Most education policy objectives addressed student retention in schools, the quality of education, nutrition education, and the overall school environment. The school setting has been recognized as a good platform for awareness raising and sharing nutrition information. **Policy instruments in schools focused on life-skills training, using SBCC approaches on hygiene and sanitation, dietary behavior change, and food safety.** Policy instruments regulating or guiding the availability of foods and drinks on school premises are only in place for school feeding programmes. (School health and nutrition strategy, School Health Program 2017, Seqota and NNPII).

Despite the multiple policy efforts described above, challenges have been experienced that point to what may be needed to accelerate progress on food system transformation. These challenges include the need to increase production diversification for agriculture to supply a more nutrient dense food basket, enhancing NSA capacity and limited resources for the magnitude of intervention required across sectors and different agro-ecological settings in the country. In addition, there has been limited attention to creating synergy across different efforts. There is, therefore, a need for prioritization of actions that are catalytic in nature. It is important to identify what such catalytic actions would be, ***and these would be the "game changing actions"*** if they affect important elements of food system transformation according to challenges alluded to in this background paper.

In response to the challenge on limited resources the Ethiopian government has responded with a historical budget allocation to nutrition of 16 million and 15.5 million USD for E.C 2012 (2019/20) and E.C 2013 (2020/21) respectively, for Seqota Declaration Innovation Phase woredas where the lion share goes to NSA interventions.

6. Interventions needed to transform food systems to provide more sustainable healthy diets

Agriculture and the market systems are important components to ensure individuals and households are food and nutrition secure and that healthy diets are accessible to all. **Raising agricultural productivity and prevention of postharvest loss remain powerful forces for reducing food and nutrition insecurity.** As indicated in Section 3 higher productivity levels can also help lower GHG emissions in the Ethiopian context. Higher production and productivity of nutrient dense foods on one's own farm or from one's own herds enhances household food and nutrition security particularly where there is limited access to markets. However, poverty constrains the ability of farming or pastoralist households to invest in productive assets and agricultural technologies. Fragmentation of land due to population pressure in rural areas, and the low prices farmers are paid for produce, mean that in many rural areas the farms are already too small to provide greater food security or a living income for the household in sub- Saharan Africa (Giller, 2020). The situation is similar in Ethiopia and the only way much improvement in food security and nutrition can take place will be by increasing productivity on the available land. The conundrum that must be addressed is how to provide inexpensive, nutritious food to feed the growing urban and rural populations while creating incentives to stimulate increased agricultural production of nutritious foods (Giller, 2020). In Ethiopia, high levels of postharvest loss of food in both quality and quantity, and insufficient value addition hampers food availability and marketing. Poor market links result in high costs of inputs and low prices for farm produce, providing poor economic incentives for farmers to invest in yield-enhancing sustainable agricultural production systems. **For both rural and urban settings, stable market access to food requires that food market value chains are efficient in supplying food that is safe and affordable, while also providing benefits to farmers and others along the food supply chain who have food to sell.** Yet, efforts in the agriculture sector, if conducted in isolation from needed activities in other sectors such as market and industry, health, and education, will not bring food and nutrition security to the majority.

Given the above challenges, considerable investment is needed in the development, dissemination, and promotion of uptake of technologies that promote regenerative farming practices to increase yields and reduce losses and indeed even GHG emissions. Similarly, investments should be made to support development and uptake of technologies that enhance food safety and shelf-life of products, helping distribution of perishable and highly nutritious products to urban areas, where often higher market prices can be obtained.

Despite over four decades of organized agricultural research and development in Ethiopia, there is no significant shift in the portfolio of crop technologies developed, improved varieties or certified seed release. **On varietal release, where cereals predominate, wheat and maize occupy the**

major share of all crops (Bishaw and Atilaw, 2016). As an illustration, in 2014, wheat and maize occupied 64 and 19% of formal seed supply, respectively, yet the crops occupied only about 13 and 17% of cultivated area, respectively (Bishaw and Atilaw, 2016). The current situation on varietal development is that: 1) grain yield, climate and pest stress tolerance have been overriding criteria for breeders and farmers, while grain quality traits for nutrition including biofortification have not been addressed for these major crops; 2) there is limited or lack of legume seed supply which are main contributors for nutritional security and environmental health (soil fertility and soil health) leading to cereal mono-cropping in the highlands; 3) there is limited or non-existent domestic vegetable seed supply and heavy reliance on imports narrowing production and diet diversity.

Ethiopia has one of the lowest animal source food consumption levels in Africa despite the very high number of livestock. Consumption is affected in part by cultural and religious practices but also because livestock is an important "economic" asset associated with resilience. The country derives much economic revenue from live meat animal exports to the Middle East and livestock production is therefore an important economic livelihood for the country. Livestock productivity for meat, dairy or eggs are very low therefore maintaining high costs of production per unit of produce affect prices and affordability while limiting revenue potential. The contribution of such low productivity levels to GHG emissions is also important and has been addressed in Section 3. **It has been indicated that limited attention has been given to productivity and development of market value chains for livestock and related products.** The role that livestock can play in regenerative agriculture needs to be explored given the large numbers of livestock Ethiopia has. In pastoralist communities, livestock are often the predominant livelihood and source of nutrition sustenance as the only readily available source of highly nutritious products, such as milk.

Food environments have an enormous influence on diets, as seen by their effective influence on triggering drastic dietary changes towards excessive consumption of packaged ultra-processed foods, beverages, and snacks in LMICs in the past decades (Popkin et al, 2020). This is also being experienced in Ethiopia especially in urban settings. The influence of food environments should be leveraged to reverse trends towards healthier food procurement systems that are profitable, yet supportive to improved consumption patterns for better nutrition and health. Examples of high-potential interventions to achieve these goals are both mandatory and voluntary food labelling adapted to ensure consumer comprehension and use (Mandel et al, 2015).

Regulations against advertising and marketing of unhealthy food products, especially to children should be considered as part of promoting better consumer choices by preventing unethical enticement of children and others towards unhealthy consumption patterns (WHO, 2006). Information dissemination, behavioral nudges, and enhancing the food environment to make the choice of sustainable, healthy foods the easier choice for consumer are also important. This includes. guidelines related to the physical food environment such as strategic positioning and presentation of healthy versus risk foods (Anzman-Frasca et al, 2015) and a combination of taxes or subsidies to discourage risk foods while encouraging healthier choices (Hawkes et al, 2020; Redondo et al, 2018; Shekar et al, 2020) must form part of a positive food system transformation for Ethiopia. Experience with testing of these approaches is mounting in Low and Middle Income Countries (LMICs) but research is needed to document successes, failures, impacts, potential for scale-up and adaptation to the Ethiopian context.

Consumer behavior change is another area of useful intervention as part of food system transformation. There is ample literature on the use of consumer behavior change interventions, including public awareness campaigns, digital interventions, and social media (Young et al, 2019) m- nutrition services (Muller et al., 2016), and social marketing by the private sector (Abril et al, 2019) and on experimental use of social norms to influence healthy eating (Robinson et al, 2014). However, most examples are from LMICs. Food choices and utilization can be improved through dissemination of recipes, chef's recommendations, and cooking classes and training. However, evidence on the impact of these strategies in influencing healthy diet choices in LMICs is extremely scarce (Webb-Girard et al., 2020). Large scale demand creation and behavior change communication strategies targeting children, adolescents and adults need to be paired with innovation in all components of the food system to maximize impacts on promoting sustainable healthy diets.

As part of promoting food system transformation, targeted social protection programs, including cash and food transfers can play an important role in promoting sustainable and healthy consumption patterns among vulnerable population components and under emergency situations. Different strategies of social protection have already been used in Ethiopia within the Productive Safety Net Programme. In the current global COVID-19 pandemic, social protection strategies have been used extensively to respond to the immediate needs of populations affected. The programs could be strengthened to support healthy diets more directly by including information, behavior change communication, and promotion of nutritious foods; providing direct incentives such as vouchers for nutritious foods; offering healthy school meals (with or without a community/school garden component) or healthy meals in office canteens and food procurement systems. It is important that such programmes be done with a food system lens to use them as levers to catalyze broader food system transformation objectives.

The 5Ps centered approach taken for this background paper can facilitate a more holistic view on the needed transformations in relation to crop and animal production, food & consumer environments, and social protection. Contribution to sustainable healthy diets regardless of the intervention domain of the food system can be used as a common goal to generate alignment and synergy.

7. Public private partnership in Ethiopia's food system transformation

We know that the private sector provides most products and services to meet most of population food and dietary needs. The International Finance Corporation (IFC) estimates that the 4.5 billion people at the "base of the economic pyramid" spend $2.3 trillion a year on food and beverages. Including business in the national nutrition program and plans, acknowledges how people live and offers the potential to impact nutrition more sustainably and at greater scale.

In its capacity as a supplier, distributor and marketer of food, private enterprise, whether multi-nationals, national companies, Small and Medium scale Enterprises (SMEs) or indeed street vendors, can be the source and inspiration of innovations of new products and technologies, new financing mechanisms and new distribution models that are needed. As an employer and as part of the fabric of communities, business can also have a significant and an important impact on achieving local nutrition goals with sustainability considerations.

The public sector is an important actor with responsibility for setting the policy and regulatory environment within which the private sector can respond with targeted provision of nutritious foods, supplements, and services that can contribute positively to improved nutrition and health outcomes for the population as a whole. The business sector is important in ensuring a continuum of access to good quality food products and services that can target consumers under different settings including those needed under emergency settings.

In Ethiopia, more businesses are recognizing that food and nutrition security is intrinsically linked to business growth, performance, and sustainability. Identifying ways to align the core commercial priorities and investments of a wide spectrum of businesses across many different sectors with national food and nutrition security goals is increasingly important for Ethiopia. **Game changing actions will be those that provide alignment of business objectives to national objectives on improving consumption patterns for better nutrition and health while limiting negative impacts on the environment.**

From a business perspective, the motivation for engaging with food and nutrition can be summarized around four drivers that should underpin business objectives with a positive food system perspective (Table 7.1). These provide entry points for public sector interventions to ensure compliance and that business can contribute positively to a food system transformation that is supportive of better nutrition and health, sustainably.

Table 7.1. The four drivers that underpin business objectives for a positive food system perspective.

Driver	Private sector response to transform the Food System	Opportunities to transform the food system
Opportunities to increase sales & profits.	Developing new dynamic markets through product, service, and business model innovations, lowering costs, and increasing the availability of nutritious foods and supplements.	Government and development partners increase public and consumer awareness and demand for good food and nutrition.
Strengthen their reputation and "license to operate".	Develop corporate social responsibility policies and strategies in line with national nutrition program objectives.	Access to food and nutrition security is both a moral obligation and a fundamental human right.
Improve their productivity.	Businesses investing in workplace appropriate nutrition programmes to see their investments repaid in a reduction of sick-days and accidents, and an increase in productivity.	Good nutrition is an essential foundation of a productive workforce and sustainable supply chain. Undernutrition undermines business productivity amongst the direct workforce and along the supply chain and impacts occupational health and safety performance

Driver	Private sector response to transform the Food System	Opportunities to transform the food system
Businesses rely on healthy communities for sustainable supply chains.	Businesses contribution to the health and well-being of the communities within which they operate being relevant to business performance.	An estimated 11% of GDP in Africa is lost to undernutrition every year, with productivity losses to individuals estimated at more than 10% of lifetime earnings. Businesses are embedded in these communities and should be interested in addressing such losses.

Business comparative advantage in nutrition is grounded in its commercial core business operations and value chains, which offer the potential for its contribution to be financially self-sustaining and scalable. As such, business offers different capabilities than the public sector. These value chains are also important for economic development and the livelihoods of many. Business activity can be leveraged to contribute along the following key areas of the food system.

- ***Scale:*** The processes and systems underpinning business operations enable business contribution to be delivered efficiently, cost effectively and at scale. This can be leveraged to deliver nutrition food and lower cost and more affordably.

- ***Product and service innovation:*** Businesses have the capabilities and resources to develop product and service innovations that can make nutritious food more available, affordable, and desirable to consumers. If diet quality and sustainability are used to inform innovation, business actions could beleveraged to contribute more positively to food system transformation than has been the case.

- ***Quality management and food safety systems:*** Businesses can embed quality management and safety systems along the food value chain, particularly in food storage facilities and packaging.

- ***Demand creation for nutritious products:*** Along the food value chain, businesses are uniquely positioned to create demand for nutritious foods - by harnessing supply chains to procure nutritious crops from farmers, by incentivizing distributors and retailers to sell nutritious foods, and by using their consumer insights, brands, marketing resources, expertise, and channels to build understanding of nutrition and change behaviors amongst consumers.

- The diet quality centered approach taken for this background paper must form a lens through whichbusiness contributes to food system transformation so that business actions are leveraged to foster transition to healthier sustainable diets within the Ethiopian context.

With the above considerations, business can thus contribute to better nutrition and health outcomes in Ethiopia in the following ways:

a. **Agriculture and nutrition:** At each stage of the food value chain, businesses can provide investment in technological innovation, and commercial capabilities to increase the supply of nutritious, safe, and diverse foods. It is important to recognize small holder farmers as entrepreneurs interested in profitable livelihoods. Game changing ideas should consider this perspective. Developing reformulated food products using nutrient enriched foods including biofortified food for example is one way of delivering affordable, more nutritious diets.

b. **Large scale food fortification:** To address widespread micronutrient deficiencies, food businesses can fortify staples and condiments with essential vitamins and minerals to reach large proportions of the population cost-effectively and at scale. Standards for iodized salt, fortification of wheat flour and edible oil have been developed and approved in Ethiopia. However, only the Salt Iodization standards are mandatory. The standards for wheat flour and edible oil have been approved as voluntary. Mandatory fortification is required to ensure adequate coverage. But investments must also include supporting monitoring micronutrient status through regular government surveys so that adjustments to fortification standards can be done timeously as micronutrient intake patterns change over time.

c. **Innovation and local solutions:** Market based approaches can increase the availability of specially formulated foods, with a particular focus on pregnant and lactating women and complementary feeding of infants, complementing public delivery systems especially under emergency settings. But care is needed to ensure protection of appropriate infant feeding practices. Exclusive breastfeeding in the first six months of life and continued breastfeeding thereafter according to WHO guidelines should not be compromised.

d. **Workplace:** Businesses across all sectors can engage in promoting education of their employees on the importance of nutrition and provide diverse and nutritious foods in the workplace with sustainability consideration. Businesses can also introduce workplace policies that facilitate access to breastfeeding facilities, childcare and maternity benefits.

e. Supporting nutrition sensitive interventions: Businesses can play a key role in strengthening underlying health systems, for example providing health and hygiene products and health services, supporting women economic empowerment and access to education.

As part of food system transformation businesses are uniquely positioned along the food value chain, the workplace and within communities, not only to increase the supply of nutritious foods but also to increase demand. The contributions that business could make can be enhanced and scaled up through greater collaboration with governments, development agencies and civil society. As for other food system transformation those within the business sector can be informed and be monitored through the diet centered approach taken in this background paper to foster synergy with other efforts. Such an approach can be a valuable game changer on business contribution to sustainable food system transformation in Ethiopia.

The SUN Business Network Ethiopia (SBN-Ethiopia) has been set up to enhance and strengthen the private sector's contributions towards improving nutrition in Ethiopia. SBN-Ethiopia will champion and mobilize business behind the Food & Nutrition Policy and National Nutrition Plan II (2016–2021) and support the Federal Government of Ethiopia to realize the National Nutrition Program and to provide a strong enabling environment for positive business engagement in nutrition, to ensure that all people have access to safe, affordable, and nutritious food in Ethiopia.

SBN-Ethiopia creates an enabling environment to commit and align business behind national nutrition strategies with the following objectives:

1. Mobilizing business in Ethiopia to contribute to reducing malnutrition in all forms.

2. Making nutrition more aspirational, accessible, affordable, and available to consumers in Ethiopia.

3. Building the case for greater business engagement in nutrition amongst all stakeholders in Ethiopia.

The game changer will be finding ways of incentivizing positive busines behavior that promotes food system transformation supportive of healthy sustainable consumption patterns.

8. Lessons from the COVID-19 pandemic

The COVID-19 pandemic and the disruptions that it has had on the food systems and agricultural value chains has amplified the need to address all the challenges that have been identified above. The lessons learned call for greater attention to market value chains to ensure continued food supply under such emergencies and targeted communication challenges to reach the public with appropriate messaging. Because of the pandemic experience there is greater urgency to implement the Digital Ethiopia 2025 Strategy to promote value chains that are more resilient to emergency shocks such as has been experienced under the ongoing COVID-19 pandemic. The following action areas of the Ministry of Agriculture's COVID Response plan are aligned with the challenges that have been alluded to elsewhere above and seeks to; 1) provide agricultural and business services for communities that includes attention to digital approaches on extension; 2) facilitate safe and timely distribution of inputs especially fertilizers; 3) increase production of vegetables and grains especially wheat that is more import dependent, including off season production using irrigation; 4) facilitate domestic and export agricultural commodity supply chains by improving market linkages, and 5) help vulnerable part of the population with food support through social protection mechanisms.

The above information reflects strong alignment with the challenges that have been identified elsewhere above and point to key areas where game changing ideas can make a difference on food system transformation.

9. Policy considerations to accelerate food system transformation in Ethiopia

A right mix of policy instruments is needed to address all forms of malnutrition across the whole food system more broadly. Interventions on the individual level to improve knowledge and practices need to be strengthened. Policy instruments must be aligned to limit or avoid potential negative trade-offs and there must be coherence of implementation for synergy across sectors and stakeholders. This would be game changing. As referred to elsewhere above the required diet quality can be a unifying factor for coherence. Business actions (both formal and informal), schools and tertiary institutions, and other institutions (hospitals, prisons etc.) should provide opportunities to promote healthy options while avoiding unhealthy options. When policies and strategies are revised, and implementation plans are made elements that foster the desired alignment for sustainable food system transformation should be included. Such considerations consider the following elements,

- **Better diet quality perspectives should be integrated within long-term visions and outcome areas** for implementation of relevant policies and strategies.

- As indicated elsewhere, **diet quality perspectives can be included in monitoring and evaluation plans** according to how diets relate to the specific policy or strategy being implemented. Appropriate indicators for this need to be developed and can be useful game changers.

- **Agricultural development programmes should be required to demonstrate how they are contributing to diversification** to a nutrient dense food basket and the related sustainability considerations and the needed attention on staple foods, legumes, and animal source foods to improve productivity, food safety, and nutrition traits. Such a focus should include aligning and increasing investments in research and development in favor of nutrient-rich foods.

- **Attention is needed to provide an enabling policy environment for development of market value- chains for nutrient dense foods** like fruits, vegetables, and animal source foods. This should include cold value-chains and related infrastructure to reduce post-harvest losses.

- **Using the lessons learnt from nutrition-sensitive programmes to maintain political will for nutrition-sensitive approaches.**

- **In monitoring progress on food system transformation attention is needed to the accompanying impact on the environment and on long term sustainability.** These elements must be included in monitoring plans of policies and their related implementation plans.

- **Research by postgraduate programmes at Ethiopian universities should be supported and structured to provide solutions to implementation challenges and the needed innovations** under different agro-ecological settings.

- Gender issues need more long-term action targeting deeply rooted social norms throughout the food system.
- **Coordination efforts must address coherence across stakeholder efforts and the needed synergy.**
- **Social protection policies should be refocused to support sustainable, healthy diets more directly.**

On policy considerations, as with earlier sections of this background paper, taking a diet quality centered approach would be game changing by unifying policy instruments around a common goal of fostering sustainable food system transformation from different domains of the food system.

10. Game changing actions on the UNFSS Action Tracks: What are the issues?

This section suggests questions that should be addressed by the UNFSS Action tracks. It provides a list of questions under each action track for which game changing actions are needed. These questions are intended to inform the planned UNFSS Dialogues that will be conducted to inform the EFSS and the UNFSS. Table 10.1 presents the theme of each of the five action tracks and the related challenges that need to be addressed to inform "game changing actions" for Ethiopia.

Table 10.1 UNFSS Action Tracks and related questions to inform game changing actions for Ethiopia.

UNFSS Action Track	Related challenges
Action Track 1: Ensure access to safe and nutritious food for all:	• How can we strengthen food safety and extend products shelf-life across the food value chains for nutrient dense foods like, milk, meat, eggs and perishable but highly nutritious vegetables? • How can we mainstream positive WASH habits widely in all sectors of the population?
Action Track 2: Shift to sustainable consumption patterns	• How can we make nutrient dense foods more available, accessible, and affordable to the majority of the population? • What is the best way to promote a viable seed/seedling sector for legumes, vegetables, and fruits? • How can we promote increased consumption of nutrient dense foods like animal source food among those that need them while at the same time encouraging moderated consumption for sectors of the population that are already overconsuming? • How can we ensure that the business sector considers product quality through nutrition, health and sustainability lenses and not profit only?

UNFSS Action Track	Related challenges
Action Track 3: Boost nature-positive production	• What regenerative food production practices can be adopted in different agro-ecological contexts in Ethiopia to foster sustainable healthy diets? • Low productivity contributes to the GHG emission challenge from the agriculture sector. What are the right production practices to increase productivity without creating negative environmental impacts under different agroecological settings? • How can food losses be reduced as a path to sustainability in agriculture and to improve food availability and affordability? • How can we make input supply efficient and accessible to farmers big and small?
Action Track 4: Advance equitable livelihoods	• The needed food system transformation must include creation of equitable livelihoods where farmers are equitably compensated. • Food systems that foster gender equity along all the steps of the chain. • What types of livelihoods can be created to support the needed food system transformation? • How can Ethiopian academic institutions incorporate the needed livelihoods in their academic programmes to support viable economic activity associated with these livelihoods?
Action Track 5: Build resilience to vulnerabilities, shocks, and stress	• Ethiopia faces frequent weather shocks that present food insecurity challenges. How can resilience be enhanced under different agro-ecological zones and at national level? • What type of early warning systems are needed?

11. What do we need from researchers to accelerate food system transformation in Ethiopia?

Research must be considered as a key component of promoting sustainable food system transformation. In the previous section, Table 10.1 alludes to areas where there are gaps for which game changing solutions are needed. In this section we present gaps according to drivers of food system transformation. Table 11.1 presents this information.

Table 11.1 Important research gaps to support food system transformation in Ethiopia.

Driver of food system transformation	Research gaps
Diet quality and food safety	• Dietary data under different agro-ecological settings is lacking. It will be important to have a National Food Consumption Surveys that are representative at the agroecological level. Such consumption surveys need to be done regularly. • Subsequent consumption surveys can be used to monitor the impact of food system transformation actions over time. • The Capacity of National Universities to contribute to generating theneeded dietary data should be enhanced. • Dietary data at the agroecological zone level will be useful to inform agricultural interventions on the supply side. How best can dietary gaps and excesses be determined across different agroecological settings to ensure contextualization. • How can food safety be improved systematically across the food system from production to consumption?
Food environments and consumer choices	• Factors influencing food choices under different cultural settings and agroecological zones must be better understood. • How are the food and consumer environments, including advertising, currently impacting consumption choices need to be better understood so that mitigating efforts can be developed to inform regulatory instruments and behavior change communication? • There is a need to build evidence of food environment approaches and document successes, failures, impacts and potential for scale-up. • How can food environment interventions be designed from consumer demand perspective? • How can consumer behavior change interventions be best packaged with interventions in other components of the food system to maximize impact? • What mechanisms can be used to monitor potential business impacts on food system transformation, both positive and negative to direct progress?

Driver of food system transformation	Research gaps
Production	• Production diversity is limited in Ethiopia. How can production and appropriate consumption of nutrient dense foods, such as fruits, vegetables biofortified crops and animal products be best promoted? • The input supply sector is of particular challenge. How can a viable seed sector be promoted? What would be most catalytic?
Transport and storage	• What types of developments are needed to support catalytic developments in the transport and storage component of the food system under different agro-ecological settings?
Post-harvest and small-scale food processing	• Post-harvest losses are a challenge. What mechanisms can be used to reduce post-harvest losses across the agricultural value chain? • What food processing technologies would be helpful in reducing post-harvest losses, extending shelf life, and improving availability and accessibility of nutritious foods under different settings?
Retailing and provisioning	• The retail sector both formal and informal, are important components of the food system. • How can provisioning of nutrient dense foods be promoted? • What mechanisms can best promote food safety systemically for retailing and provisioning? • What type of market information, advertising guidelines & labelling would be most effective to change consumer behavior in such a way as to increase demand for sustainable healthy diets under different settings? • What types of incentives would be helpful to encourage moderation of the consumption of (ultra)processed foods under different settings?
Governance	• How can FBDGs be used to inform policies and strategies for food system reform and how can impact be monitored? • What would be appropriate strategies for improving the affordability of healthier diets? • On social protection, what combinations of strategies are most effective under different settings
Cross-cutting	• How can food system interventions be packaged to accelerate food system reforms and impact on food system transformation toward healthy and sustainable diets?

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