THE NUTRITION TRANSITION IN URBAN ETHIOPIA DURING RAPID ECONOMIC GROWTH (2000-2016)

By

TSEGAZEAB BEZABIH WOLDEYOHANNES

submitted in accordance with the requirements.

for the degree of

DOCTOR OF PHILOSOPHY

in the subject

Development Studies

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROFESSOR GRETCHEN DU PLESSIS

Date April 2024

DEDICATION

This thesis is dedicated to my father, *Kesis* Bezabih Woldeyohannes (*Lique Heruyan)*, who instilled in me a passion for reading during my childhood. His motivation and life of perseverance continue to inspire me many years after his death.

DECLARATION

NAME: T B WOLDEYOHANNES

STUDENT NUMBER: 64046265

DEGREE: PHD IN DEVELOPMENT STUDIES

TITLE OF THE THESIS: THE NUTRITION TRANSITION IN URBAN ETHIOPIA DURING RAPID ECONOMIC GROWTH (2000-2016)

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality-checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

I declare that during my study, I adhered to the Research Ethics Policy of the University of South Africa, received ethics approval for the duration of my study prior to the commencement of data gathering, and have not acted outside the approval conditions.

Signature: ______________________

Date: 2024/04/05

ACKNOWLEDGEMENTS

I would like to express my gratitude to the following individuals, because without their help, I would not have been able to complete my PhD.

- My supervisor, Professor Gretchen Du Plessis, whose insight, and vast knowledge of the subject guided me through this research project. This study was completed thanks to her thoughtful comments and guidance, enthusiasm for the project, encouragement, and patience.
- My colleagues and friends Abiy Wogderes, Dr. Arega Shumetie, Mamo Getahun, and Workneh Abebe, who have provided technical advice in their areas of expertise while also dealing with my stress over the past few years. This project would have been a far more difficult undertaking without them.
- Mulumebet Merhatsidk, Dr. Mehereteselassie Menbere, Alemtsehai Alemu, Dr. Yitbarek Kidane, my colleagues and friends, for their constant encouragement, follow-up, and support throughout the research project.
- My research assistants, Abreham Alemu and Betselot Abera, for their diligent work in coordinating the qualitative data collection. The FGD participants are also acknowledged for sharing their knowledge and experiences. Carol Jansen, who meticulously edited the manuscript, is acknowledged for her efforts.
- My mother, Woletemariam Tafesse, my brothers Dr. Merhatibeb, Dr. Samuel, *Kesis* Ermias, Dr. Aemiro, and Beniam (Engineer), as well as my sister Sr. Dibabishwork, for their unwavering support throughout my engagement in this project.
- My wife, Mekdes, and my son, Burake, for their tremendous understanding and encouragement in the past few years. Their belief in me has kept my spirits and motivation high throughout.

LIST OF ACRONYMS AND ABBREVIATIONS

ADLI	Agriculture Development Led Industrialization
AE	Adult equivalent
ASF	Animal source foods
BLUE	Best linear unbiased estimator.
BMI	Body Mass Index
CI	Confidence interval
CMNN	Communicable, maternal, neonatal, and nutritional
COICOP	Classification of Individual Consumption According to Purpose
COVID-19	Coronavirus disease
CPI	Consumer Price Index
CSA	Central Statistics Agency
CSV	Comma separated value
DBD	Double burden of diseases
DHS	Demographic and health survey
EA	Enumeration area
EDHS	Ethiopian Demographic and Health Survey
EFDA	Ethiopian Food and Drug Authority
EFMHACA	Ethiopian Food, Medicines and Health care Administration and Control Authority
FAFH	Foods away from home
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FBS	Food balance sheet
FDRE	Federal Democratic Republic Ethiopia
FGD	Focus Group Discussion
FMOH	Federal Ministry of Health
GBD	Global Burden of Disease
GDP	Gross Domestic Product
GLS	Generalised Least Square
GNI	Gross National Income
GOE	Government of Ethiopia
GPS	Global Positioning System
GTP	Growth and Transformation Plan
HCES	Household Consumption expenditure survey
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IUD	Intrauterine device
Kcal	Kilocalorie

MDG	Millennium Development Goal
MOFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
NCD	Non-communicable diseases
NNP	National Nutrition Programme
NPC	National Planning Commission
OLS	Ordinary least squares
PAE	Per adult equivalent
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PPP	Purchasing Power Parity
PRSP	Poverty Reduction Strategy Paper
PUFA	Poly-unsaturated fatty acid
SDG	Sustainable Development Goals
SFA	Saturated fatty acid
SSB	Sugar-sweetened beverages
SSU	Second Stage Unit
TFC	Transnational Food Corporations
TFR	Total Fertility Rate
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UNISA	University of South Africa
UPF	Ultra-processed foods
USD	United States Dollar
USDA	United States Department of Agriculture.
VAT	Value added tax
WDI	World Development Indicators
WFP	World Food Programme
WHO	World Health Organization
WMS	Welfare monitoring survey
YLL	Years of life lost

SUMMARY

This study sought to examine the patterns and drivers of the nutrition transition in urban Ethiopia between 2000 and 2016, which coincided with a period of rapid economic expansion and urbanisation. A mixed-methods research approach combined quantitative data from nationally representative, repeated, cross-sectional surveys with qualitative data gathered through focus-group discussions. It revealed that during the last two decades, urban Ethiopia has been through a nuanced nutrition transition. The transition is underpinned by factors, such as a demographic transition (the composition of the population in terms of age, gender, household size, marital status, and level of education), an economic transition (income, real price, and affordability of food), an epidemiologic transition (perceived causes and consequences of diseases), food-market changes (government subsidy and supply), and an agricultural transformation. The past two decades saw the double burden of malnutrition (with decreasing levels of undernutrition) and growing levels of overnutrition. Despite the overall average calories derived from cereals increasing, their share in total consumption plummeted because of the rapid increase in the contribution of other food categories. The consumption of pulses remained stable, but the share of dietary energy derived from fats and oils continued to rise, replacing the share of starchy staples. The increased consumption of refined cereals and vegetable oil is a feature of the nutrition transition in urban Ethiopia. The gradual but steady increase in the adaptation of "Western diets" largely applies to higher-income groups and the younger generation. This impending nutrition transition, although at an early stage still, has ramifications for nutrition and food security, environmental, social, and economic sustainability, food sovereignty, and public health. Policy interventions are recommended to delay or reverse the detrimental course and to address the exigencies associated with a nutrition transition.

KEY TERMS: Nutrition transition, urban Ethiopia, ultra-processed foods, obesity and overweight, Dietary shift, Nutrition related non-communicable diseases (NCD), Oaxaca-Blinder decomposition, food environment, sustainable food systems, food sovereignty.

TSHIVENDA

Ngudo i lingedza u sedzulusa phatheni na tshanduko dza zwiṱuṱuedzi za pfushi ngei Ethiopia ḓoroboni vhukati ha 2000 na 2016, zwe zwa ṱangana na tshifhinga zwa nyaluwo ya tshihaḓu ya ikonomi na u itwa ha ḓorobo. Kuitele kwa ṱhoḓisiso ya ngona yo ṱanganelaho kwo ṱanganaho na data ya khwanthithethivi u bva kha vhuimeleli ha lushaka, ndovhololo, tsedzuluso dza mutumubuḓo hu na data ya khwaḽithethivi yo kuvhanganywaho nga kha therisano dza zwigwada zwo sedzwaho. Zwo dzumbulula uri musi wa miṅwaha ya fumi mivhili yo fhiraho, Ethiopia ḓoroboni ho fhira kha tshanduko nga kha pfushi dza ndeme. Tshanduko yo tikwa nga zwivhumbi zwi nga ho sa tshandukisatshivhumbeo (tshivhumbeo tsha tshitshavha u ya nga ha vhukale, mbeu, muelo wa muṱa, vhuimo ha mbingano, na ḽevele ya pfunzo), tshanduko ya ikonomi (mbuelo, mutengo wa vhukuma, na u swikelelea ha zwiḽiwa), na), u shanduka ha u phaḓalala ha tshitshavha (zwivhangi zwo vhoniwaho na zwivhangi zwa vhulwadze), tshanduko dza maraga wa zwiḽiwa (mutikedzelo wa muvhuso na nḓisedzo) na tshanduko ya zwa vhulimi. Miṅwaha ya fumi mivhili yo fhelaho yo vhona muhwalo na kavhili wa pfushi dzi si dzavhuḓi (hu na u fhungudzea ha ḽeveḽe vhushayapfushi) na ḽeveḽe dza u ḓalesa ha pfushi. Naho mbalotshikati nyangaredzi ya khaḽori dzo bvaho kha u engedzea ha zwiḽiwa zwa thoro, mukovhe wazwo kha ṱhanganyelo ya tshumiso wo gonya nga ṅwambo wa nyaluwo tshihaḓu kha u dzhenelela ha dziṅwe khethekanyo dza zwiḽiwa. Tshumiso ya zwipiḓa yo dzula yo dzika, fhedzi mukovhe wa fulufulu ḽa kuḽele ku bvaho kha mapfura na ole yo bvelaphanḓa na u gonya, zwa ima vhuimoni ha mukovhe wa zwifaratshiṱatshi. U engedzea ha zwiḽiwa zwa thoro zwo gaiwaho na ole ya miroho ndi tshiṱaluli tsha tshanduko ya pfushi ngei Ethiopia ḓoroboni. U engedzea nga zwiṱuku kha nyanḓano na “kuḽele kwa Vhukovhela” zwo ḓalesa vhukati ha zwigwada zwa miholo ya nṱha na murafho wa vhaswa. Tshanduko iyi ine ya khou itea ya pfushi, naho hu tshe matsheloni khayo, i na masiandaitwa a pfushi na tsireledzo ya zwiḽiwa, mutakalo wa vhupo, wa matshilisano, na u sa nyeṱha ha ikonomi, maanḓa a zwiliwa na wa tshitshavha. U dzhenelela ha mbekanyamaitele hu a themendelwa u itela u lengisa zwivhangi zwi re khombo na u livhana na ṱhoḓea dzi elanaho na tshanduko ya pfushi.

OPSOMMING

Hierdie studie het die patrone en aandrywers van die voedingsoorgang in stedelike Ethiopië tussen 2000 en 2016 ondersoek, wat met ’n tydperk van vinnige ekonomiese uitbreiding en verstedeliking saamgeval het. ’n gemengdemetode-navorsingsbenadering, bestaande uit kwantitatiewe data uit nasionale verteenwoordigende, herhaalde deursneeondersoeke en kwalitatiewe data uit fokusgroepbesprekings is gevolg Dit het aan die lig gebring dat stedelike Ethiopië die afgelope twee dekades ’n genuanseerde voedingsoorgang beleef het. Die oorgang is ondersteun deur faktore soos demografiese oorgang (die samestelling van die bevolking ten opsigte van ouderdom, geslag, die grootte van huishoudings, huwelikstatus en vlak van opvoeding), ekonomiese oorgang (inkomste, werklike pryse en die bekostigbaarheid van kos), epidemiologiese oorgang (waargenome oorsake en gevolge van siektes), voedsel-markveranderinge (staatsubsidie en voorsiening), en landboutransformasie. Gedurende die afgelope twee dekades is die dubbele las van wanvoeding (met dalende vlakke van ondervoeding) en toenemende vlakke van oorvoeding waargeneem. Al het die algehele gemiddelde kalorieë afkomstig van graan toegeneem, het hulle aandeel aan totale verbruik skerp gedaal as gevolg van die vinnige toename in die bydrae wat ander voedselkategorieë gelewer het. Die verbruik van peulvrugte het stabiel gebly maar die gedeelte van energie verkry uit dieet afkomstig van vette en olies het aanhou styg en styselstapelvoedsel se gedeelte vervang. Die toenemende verbruik van verfynde graan en plantaardige olie is ’n kenmerk van die voedingsoorgang in stedelike Ethiopië. Die geleidelike maar bestendige neiging om “Westerse diëte” aan te neem, word hoofsaaklik by hoër inkomstegroepe en die jonger generasie opgemerk. Hoewel hierdie naderende voedingsoorgang in ’n vroeë stadium is, kan dit gevolge vir voeding en voedselsekuriteit, omgewings-, maatskaplike en ekonomiese volhoubaarheid, voedselsoewereiniteit en openbare gesondheid hê. Beleidsingrypings word aanbeveel om die nadelige verloop van sake te vertraag of om te keer, en aandag moet aan die eise wat met ’n voedingsoorgang geassosieer word, gegee word.

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1.1 BACKGROUND TO THE RESEARCH PROBLEM

Hunger and undernutrition are two of the greatest scourges facing our planet (Brabin, Coulter, Cook & Zumla 2003; Fanzo 2012; Compact 2025 2018). According to the 2022 *World Food Security and Nutrition Report* (FAO, IFAD, UNICEF, WFP & WHO 2022) an estimated 768 million people were undernourished in the year 2021, signifying that approximately one out of every ten people in the world do not consume sufficient dietary energy to maintain a normal, active, and healthy life. Out of these undernourished people, 260.6 million were living in Sub-Saharan Africa, which constitutes around 23.2% of the total population of the continent (FAO et al 2022).

Undernutrition has been called the "*silent emergency*" responsible for around 45% of deaths among children under the age of five years, mainly in low and middle-income countries (Black, Victora, Walker, Bhutta & Christian 2013). According to the joint estimate by UNICEF, WHO and the World Bank for the year 2022, 148.1 million children (22.3%) under the age of five years are stunted, and 45 million children (6.8%) under the age of five years were wasted. The data further suggest that the prevalence of stunting in Africa is decreasing, even though the absolute number of stunted children has steadily increased from 54.5 million in 2000 to 63.1 million in 2022 (UNICEF et al 2022).

Whilst a considerable proportion of the population is suffering from hunger (GHI 2022) and undernutrition related to persistent conflicts, extreme poverty in segments of the population, and droughts, developing countries are experiencing a unique paradox in having to deal with the simultaneous burden of problems associated with undernutrition and over-nutrition or obesity (Caballero 2005; Vonke 2011; Gillespie & Haddad 2001). Globally, 2.01 billion adults, which constitutes one-third of the adult population, are overweight, of whom 678 million are obese (WHO 2018). The overlap of undernutrition (i.e., micronutrient deficiencies, underweight, and childhood stunting and wasting) and over-nutrition (overweight and obesity) that occurred in middle-income countries and some low-income countries is referred to as the "*double burden of malnutrition*" (WHO 2017; DeMaio 2019:25). The double burden of nutrition can occur at the individual, household, or population level. At the individual level, obesity may coexist with micronutrient inadequacy or stunting, for example a woman may be overweight and anemic, but her child may be underweight or stunted. Overnutrition and undernutrition may coexist at the community, national, or regional levels due to disparities in access to healthy diets, nutrition awareness, the availability of low-cost ultra-processed foods and beverages, etc. (Popkin, Corvalan & Grummer-Strawn 2020).

Over-nutrition is associated with urbanisation, technological developments and changes in dietary patterns and physical activity (Bosu 2014; Friel, Chopra & Satcher 2007). Popkin (2002) and Popkin and Du (2003) suggest that the diets of the developing world are shifting rapidly from traditional ones dominated by starchy, low variety, low fat, high-fibre foods to diets commonly known as "western diets" that include processed foods higher in saturated fats, caloric sweeteners, and salt. These dietary changes are compounded by lifestyle changes that reflect reduced physical activity for both work and leisure (Poskitt 2009:1-11). Popkin (1993:138-157) refers to the shifts in diet and activity patterns as the nutrition transition. These changes are reflected in nutritional outcomes, such as changes in average stature and body composition (Popkin 2006a).

Popkin (2002:93-103) describes a nutrition transition model as having five chronological stages. Stage one is food gathering, characterised by diets high in carbohydrates and fibre and low in fat, especially saturated fat. Stage two is famine, where diets become much less varied and are subject to larger variations with periods of acute food scarcity. Stage three is characterised by receding famines, when access to fruit, vegetables and animal proteins increases, and starchy staples become less important in the diet. Stage four pertains to degenerative diseases, characterised by diets high in total fats, cholesterol, sugar, and other refined carbohydrates, and low in polyunsaturated fatty acids and fibre. Stage five involves the behavioural change phase towards a healthy, balanced diet. Most of the global population is at stage three or four (Ervin, López-Carr & López-Carr 2013).

Breewood (2018) notes that the term ‘’nutrition transition’’ most often refers to the shift from stage three to stage four. Popkin (2002:109) adds that the pace of the nutrition transition from stage three to stage four is accelerating in lower- and middle-income countries. However, there is no evidence that the nuanced, linear, progressive, deterministic, five-staged nutrition transition model occurs universally. The researcher tested this assertion in the study by exploring the unique characteristics of the nutrition transition in the study area.

Popkin (2001) points out that nutrition transitions tend to coincide with or are preceded by a demographic transition and an epidemiologic transition. Caldwell, Caldwell, Caldwell, McDonald and Schindlmayr (2006) describe a demographic transition as shifting from a high fertility and mortality pattern to one of low fertility and mortality. The associated epidemiologic transition, as described by Omran (1971:509-538), on the other hand, is the shift from a pattern of high prevalence of infectious disease to one of high prevalence of chronic and degenerative disease. The nutrition transition from stage three to stage four is linked to the epidemiologic transition as characterised by a decrease in diseases that are caused by hunger or insufficient access to nutritious food and an increase in chronic, degenerative, non-communicable diseases (NCDs) associated with sedentary lifestyles and excessive intake of calories (Popkin 1993; Popkin 2006a).

Notwithstanding the demographic and epidemiological transitions, globally, populations are ageing. Giuli, Para, Mocchegiani, and Marcellini (2012) found an inverse relationship between age and the consumption of unhealthy foods. Urbanisation is associated with the increased consumption of animal and dairy products, sugar-rich food, fast foods and fewer fruits and vegetables and with a more sedentary lifestyle which sets the scenario for obesity and NCDs that are associated with epidemiologic transition (Popkin 1999).

Bosu (2014) and Puska (2002) found that there are marked dietary changes during a nutrition transition in low and middle-income countries, notably increased intakes of total and saturated fat and sugar. Astrup and Brand-Miller (2012), Bleich, Cutler, Murray, and Adams (2008) and Swinburn, Sacks and Ravussin (2009) found that the dietary and activity changes in developing countries are leading to a greater incidence of overweight and obesity. Overweight and obesity lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides, and insulin resistance (Han & Lean 2016). A steady increase in a person's body mass index (BMI) increases the risks of coronary heart disease, ischemic stroke and type 2 diabetes mellitus, and various cancers (Calle, Thun, Petrell & Rodriguez 1999; Must, Spadano, Coakley, Field, Colditz & Dietz1999; WHO 2018).

In sub-Saharan Africa, the shifts in dietary and activity patterns, body composition, and the concomitant nutrition-related NCDs are growing at a faster rate within the lower economic strata of the population than what has been witnessed for other countries (Vorster, Kruger & Margetts 2011; Popkin & Gordon-Larsen 2004). Hales and Barker (2001), Popkin, Richards and Monteiro (1996) and Fung (2010) suggest that foetal malnutrition, and malnutrition during childhood, "programmes" the human body to develop a more efficient energy metabolism and thus, to have a higher propensity to develop obesity and related NCDs. This may imply that dietary transitions in Sub-Saharan Africa put more people at an increased risk of developing obesity during their adulthood because of a substantial proportion of undernourished and malnourished children in the past decades. The WHO *Global Health Observatory Data* indicate that the burden of overweight and obesity and the associated NCDs are on the rise in many African countries, particularly among women in urban areas. According to Ng, Fleming, Robinson, Thomson, Graetz, and Margono (2015), the prevalence of overweight and obesity among women aged 21 and older in the eastern regions of sub-Saharan Africa was estimated to be 23.7% and 8.8%, respectively, in

2013. This suggests that a sizable portion of the working population is experiencing the negative effects of overnutrition and related problems.

Popkin (2006) notes that the nutrition transition can have an impact on the economy of a country, as it reduces the productivity of the population and overburdens the health system. Significant economic repercussions of obesity include lower productivity, an increase in disabilities, higher health care expenditure, early retirement, and a shorter period of healthy, disability-free existence throughout life (Shekar & Popkin 2020). For example, obesity is estimated to cost China 8.73 % of its GDP in 2025 (Shekar & Popkin 2020). Atun, Davies, Gale, Barnighausen et al. (2017) estimated that in 2015, the economic burden of diabetes for Sub-Saharan Africa was US$19.45 billion and would likely to increase to US$35.33-59.32 billion by 2030.

1.2 PROBLEM STATEMENT

Dietary changes representing the nutrition transition, characterized by a decrease in consumption of coarse grains, staple cereals, and pulses and an increase in consumption of animal foods, sugar, salt, fats and oils, refined grains, and processed foods, are occurring at varying places and patterns across regions and populations (Hawkes, Harris & Gillespie 2017). In addition, there is insufficient evidence documenting the nuances of these changes in and between different countries (Popkin, Adair & Ng, 2012). As it is the case in most African countries, research is sparse on the pace and pattern of the nutrition transition and its drivers in Ethiopia. Ethiopia has been one of the world's fastest-growing economies for more than a decade. The economy has experienced strong and broad-based growth over the past decade, averaging 10.5% per year in 2003/04—2015/16 compared to the regional average of 5.4% (World Bank Group 2017). The urban population of Ethiopia has more than doubled within the past two decades, one of the fastest-growing urban populations in the world (World Bank Group & Cities Alliance 2015). Ethiopia, on the other hand, ranks 104th out of 121 countries in the world, has one of the highest Global

Hunger Index (GHI 2022), and malnutrition is still widespread (Raru, Ayana, Merga, Negash, Deressa, Birhanu, Hassen, & Roba 2022). The economic growth, coupled with demographic changes and urbanisation, is likely to have brought about changes in diet, lifestyle, and nutritional outcomes in urban Ethiopia, however, the nature of the changes over time and across different population categories are unknown.

There are indications that a nutrition transition is taking place in Ethiopia, particularly in the urban settings. An IFPRI study (Hassen, Dereje, Minten & Hirvonen 2015) suggests that there is a gradual shift towards high-value foods, such as animal products, fruits and vegetables, and processed foods. The Ethiopian Health and Demographic Survey (EDHS) results show that the prevalence of overweight and obesity is increasing. Between 2005 and 2016, the prevalence of overweight and obesity among adult women in urban Ethiopia rose from 11.9% and 2.3% to 15.8% and 5.6%, respectively (CSA & ORC Macro 2006; CSA & ICF 2017). Compared to the other regions, the capital city, Addis Ababa, has the highest prevalence of overweight (21.7%) and obese (7.7%) women of reproductive ages, namely 15 to 49 years (CSA & ICF 2017).

While the level of obesity in Ethiopia is relatively low compared to most other Sub-African countries, the rapid economic growth and urbanisation the county has experienced in the past decade have the potential to increase the level and its impacts further. The Global Burden of Disease study suggests that the contribution of NCDs (cardiovascular diseases, diabetes, cancer, and others) in Ethiopia increased from 27% in 1990 to 41% in 2015 (Misganaw, Haregu, Deribe & Assefa 2017). These sobering trends, unless understood well and abated decisively, will have far–reaching implications for the economy, health care system and social system of the country.

Little is known about how these changes are evolving over time in Ethiopia in general and in urban Ethiopia in particular. To understand the true nature of the changes, it is imperative to examine within-country trends and to identify factors driving the change in urban Ethiopia. The knowledge generated through rigorous research from nationally representative surveys complemented by qualitative data can be used to design appropriate policy options to prevent or delay the detrimental consequences of a nutrition transition in the country. The problem statement undergirding this study is hence identifying the patterns, trends, and drivers of the nutrition transition in urban Ethiopia between 2000 and 2016.

1.3 RESEARCH OBJECTIVES

The study has one main research objective and four secondary objectives.

1.3.1 Main research objective

The main objective of the study was to examine the patterns, trends, and drivers of the nutrition transition in urban Ethiopia during the period 2000 and 2016 that overlaps with rapid economic growth and urbanisation in the country.

1.3.2 Secondary research objectives

- To examine the trends and patterns in quantities of dietary consumption, household food consumption expenditure, and calorie intake derived from different dietary categories across socio-economic and demographic groups in urban Ethiopia for the period 2000 to 2016.
- To identify the drivers and household-level determinants of the nutrition transition in urban Ethiopia.
- To examine the patterns of adult obesity and overweight and their determinants in urban Ethiopia.
- To develop a model to describe the unique characteristics of the nutrition transition in urban Ethiopia and to recommend policy options to mitigate negative exigencies.

1.4 SCOPE OF THE STUDY

This study focused on urban Ethiopia using representative surveys conducted between 2000 and 2016. The main datasets used to explore the objectives of this study are the Household Consumption Expenditure Surveys (HCES) carried out by the Central Statistical Agency (CSA) of the Government of Ethiopia. So far, the Agency has conducted six rounds of HCES in Ethiopia. These surveys were conducted in 1995, 2000, 2005, 2011, 2016, and 2021. The detailed consumption data from the four rounds of HCES conducted between 2000 and 2016 are analysed to understand the nature and drivers of nutrition transition in urban Ethiopia.

The HCES conducted in 1995/96 were not included in this study for two reasons. Firstly, the HCES in this round was significantly different from the HCES in later rounds (2000, 2005, 2011, and 2016) in terms of their survey designs and questionnaires which inhibits the comparability of the results across different rounds of the HCES. Secondly, the study is directed particularly at dietary changes overlapping with the period during which the country experienced accelerated economic growth. The endeavour to extend the study period until 2021 by incorporating the most recent 2021 survey into this study was unsuccessful since the data were not made available for secondary analysis until this study was completed.

In fact, Ethiopia went through double-digit economic growth as of 2003 and continued throughout 2016. Inclusion of the 2000 data serves as a baseline depicting the situation immediately before the double-digit economic growth. The other quantitative data used for this study, namely, the Welfare Monitoring Survey (WMS) and the EDHS, match the survey years of the HCES. This study mainly covers the 16-year period spanning between 2000 to 2016. As it has been the case in other developing countries, the economic growth of Ethiopia in this period may have influenced households' dietary consumption behaviour patterns. The qualitative data collection was carried out in 2022 and does not overlap the quantitative data's timespan because the qualitative component of the research design is intended to provide context to the evolving nature of the nutrition transition without specifying a specific period of time.

The study was limited to only urban Ethiopia covering big, medium, and small towns. Studies in developing countries conducted by Hawkes, Harris, and Gillespie (2017) and Popkin (1999) suggest that urban residents lead the nutrition transition due to the relatively easier access to urban food environments, particularly to supermarkets, food vendors, and restaurants. Limiting this study to the urban setting, where the environment is favourable for nutrition transition to take place, helped to generate a refined and focused knowledge base for optimal policy options.

The main indicators employed to measure the nutrition transition in urban Ethiopia include quantities of different food items consumed, calories derived from different food sources, and household consumption expenditure on different food items/ groups. BMI is used to measure adult obesity and overweight.

1.5 IMPORTANCE OF THE STUDY

Food plays a critical role in the economy, health, cultural values, and social life of people. A large share of the population in developing countries is engaged in the production and preparation of food. In these countries, the largest share of the incomes of households is usually spent on food. According to the WFP (2019), food constitutes 51% of household budgets in Ethiopia.

Understanding the nature of changes in the dietary consumption thus has critical implications for planning in the agricultural, health, social, industrial, transport, environment, trade, and economic sectors of the country. Systematic examination and understanding of changes in the level and diversity of food consumption, the extent of change in the consumption of local staples and the introduction of new food groups, the characteristics of dietary changes among different socio-economic and demographic groups and the drivers of these changes are important for policy discourse and development planning.

The knowledge generated from this study informs policy directions open to the country to prevent or delay the possible undesirable consequences of these changes and capitalise on the opportunities. As this study is largely based on a set of nationally and regionally representative surveys, the findings contribute to the literature on nutrition transitions and related policy dialogues in Africa in general and in Ethiopia in particular. The research can serve this purpose by providing an understanding and interpretation of the situation, defining the scope of the problem, and providing policy recommendations to address the problem.

1.6 DEFINITIONS OF KEY TERMS

- **Urban:** For this study, the areas identified as urban include all administrative capitals (region, zone and woreda capitals), localities with the Urban Dweller's Areas, and all localities that have a population of 1 000 or more persons and whose inhabitants are primarily engaged in non-agricultural activities (CSA 2018).
- **Household consumption expenditure**: This is defined as the amount spent by a household on consumer goods and services that were purchased directly with cash, own production, barter, or, received as income in kind (CSA 2018).
- **Net calories:** This is defined as the total number of kilocalories in a given quantity of food after removing the inedible portions. It is computed by subtracting the calories of the inedible material (refuse) from the gross calories (CSA 2018).
- **Nutrition transition**: This is defined as a five-stage model used to describe the shifts in diets, physical activity and causes of disease that accompany changes in economic development, lifestyle, urbanisation, and demography. In this study, in most cases, the term is used to refer to the shift from traditional diets dominated by starchy, low variety, low fat, and high fibre (stage three) to "Western" diets that are rich in fats, sugars, meat, and highly processed foods, accompanied by a rise in sedentary lifestyles (Popkin 1993; Popkin 1999; Popkin 2006b).
- **Obesity** is defined as a BMI of 30 kg/m^2 or more among adults. It is usually a result of an imbalance between the energy consumed (too much energy-dense foods and drinks that are high in sugars and fats) and energy expended (too little physical activity). Adults with a BMI of 25 or more are considered to be overweight (WHO, 2018).

- **The obesogenic environment** encompasses the food environment, social norms, and physical environment encouraging people to consume energy-dense foods and lead a sedentary lifestyle, which can contribute to excessive weight gain.
- **A food environment:** Is defined as the physical, economic, political, and social context in which consumers interact with the food system to decide how to obtain, prepare, and consume food (High Level Panel of Experts on Food Security and Nutrition 2017).
- **Food balance sheet**: This a comprehensive picture of the pattern of a country's food supply in a certain period of time. It presents the quantities of primary commodities and processed commodities potentially available for human consumption - the sources of supply and their use (FAO 2008).

1.7 STRUCTURE OF THE THESIS

This thesis is organised into seven chapters. The overview of contents included in each chapter is outlined below:

- In the first chapter, the researcher provides a background to the study, introduces the problem statement and objectives of the study, discusses the scope and limitations of the study, and defines the key concepts included in the study.
- In Chapter two, the researcher presents the previous works related to the current research problem. Chapter two is an overview of current knowledge, methods, and gaps in the existing research related to the nutrition transition. The theoretical framework and conceptual framework of the study are also presented and discussed in this chapter.
- In the third chapter the researcher delves into the context of the study setting. Key features of the Ethiopia that are relevant to understand and explain the nutrition transition are analysed critically and presented. Data from multiple sources have been used to shed light on the economic transition, features of urbanisation, the demographic transition, and the epidemiologic transition in Ethiopia. The amount of food available from various sources (food balance sheets) and policies

governing the production and procurement of food in Ethiopia are also highlighted in the chapter.

- In the fourth chapter the researcher details the research method employed to conduct this study. The sampling design of the secondary quantitative data sources of HCES and DHS are presented to help readers understand the nature of the data used in this study. In this chapter the researcher explains the approaches and methods followed to conduct the primary qualitative data collection. The methods of data analysis employed in this study along with the indicators (measurements) are also elucidated in the chapter.
- In the fifth chapter, the findings from the quantitative data from repeated cross-sectional HCES and DHS are presented and analysed to understand the trends and patterns of change in the consumption of starchy staples and pulses, vegetables and fruits, animal source foods (meat, milk and dairy products, eggs, etc), processed and ultra-processed foods, and fats and edible oil. Patterns, trends, and determinants of overweight and obesity in Ethiopia are also presented and analysed.
- The subsequent chapter expounds the findings from the qualitative data collected through focus group discussions.
- In the concluding chapter, the researcher triangulates the findings from the quantitative and qualitative data and compares the findings to the literature. The findings are discussed, and arguments are advanced in the light of theoretical frameworks that include: Popkin's nutrition transition model, globalisation, sustainable food systems, and food sovereignty. The findings and discussions are the basis for drawing the conclusions and recommendations that constitute the contribution of the study to the knowledge base on the nutrition transition, the policy implications of the findings, and recommendations stemming from the findings.

CHAPTER 2: LITERATURE REVIEW, THEORETICAL FRAMEWORK, AND CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION

This chapter surveys the literature on the nutrition transition and presents the study's theoretical and conceptual framework. The literature review provides the background to the nutrition transition theory, including the associated concepts, characteristics, and its drivers, as well as its consequences, namely, obesity and nutrition related NCDs. The conceptual framework of the study is established based on the theoretical and empirical evidence in the literature.

2.2 THE NUTRITION TRANSITION

Popkin's (2003) nutrition transition model elucidates how the dietary shifts along with the sedentary urban lifestyles lead to a rise in the prevalence of overweight, obesity, and related NCDs. Major dietary changes representing nutrition transition are the increased consumption of "Western foods" that are high in saturated fats, sodium, sugar, and refined carbohydrates, but are low in fibre. On the other hand, it is also manifested in terms of a decrease in the level of consumption of traditional diets high in fibre, including starchy staples, legumes, and vegetables and fruits (Popkin & Ng 2021; Popkin 2006a; Baker & Friel 2014). Such a change in a dietary pattern is associated with obesity and diet related NCDs (Swinburn, Caterson, Seidell & James 2004; Webster, Dunford & Neal 2010).

Marabou (2006) attributes the nutrition transition largely to the scarcity of food supply in Europe during World War II that encouraged the adoption of food policies that promoted the consumption of meat, milk, butter, and sugar. Hawkes, Chopra, Friel, Lang and Thow (2007), however, conclude that the shift towards diets high in oils, sugar, and processed food in high-income countries generally began around the time of the industrial revolution. The dietary shift coupled with a decline in physical activity that began in the United States (US) and Europe in 1970s spread to low- and middle-income countries in the 1990s (Popkin, Adair & Ng 2012). Nowadays, even the poorest countries are dominated by the emergence of nutrition related NCDs as a result of the nutrition transition (Popkin, 2009).

Popkin and Ng (2022) observe that all nations appeared to be converging on diets heavy in saturated fat, salt, sugar, and processed carbohydrates and lacking in fibre and other critical natural components, albeit they retain many characteristics of traditional food preparation and eating habits. This phenomenon is commonly referred to as the "Westernisation of diets," since it is widespread among inhabitants of the US, the United Kingdom (UK), and Europe. It was once believed that the nutrition transition only affects developed nations, but this belief has since been disproven as increasingly developing nations, are beginning to experience a similar trend (Popkin 2001; Popkin 2003).

2.2.1 Dynamics of dietary change

The dietary changes that characterise the nutrition transition are both quantitative and qualitative in nature (Drewnowski & Popkin 1997:33-43). Popkin (2012) demonstrates that the dietary shift associated with nutrition transition in low- and middle-income countries and in all urban areas of the world is defined by the increased intake of refined carbohydrates, added caloric sweeteners, fats, and animal-source foods and the shift away from legumes, other vegetables, and coarse grains. These changes are occurring in developing countries at a faster pace and at earlier stages of countries' economic and social development than what has been recorded for developed countries (Popkin, 2003). In urban parts of Africa, with the spread of supermarkets and convenience stores, there is an increasing shift away from the consumption of legumes and coarse grains to the consumption of refined grains (Popkin et al. 2012). Raschke and Cheema (2008:662-674) outline the nutrition transition in East Africa as characterised by the replacement of indigenous and traditional food habits with globalised food systems.

Abrahams, Mchiza and Steyn (2011) and Jacks, Sllining and Popkin (2015) point out that most of the countries in Sub-Saharan Africa are in the early stages of the nutrition transition, which is characterised by a reduced intake of starchy staples, increased intake of fruit, vegetables, and animal protein; progressively leading to the increased consumption of fat, refined carbohydrates, sugar, and processed foods. On the other hand, in some countries like South Africa, the nutrition transition is at an advanced stage whereby a considerable proportion of the population is affected by the health outcomes of the dietary shift and sedentary lifestyle. Some 90% of the food value consumed in South Africa is made up of processed foods, whereas 55% of it comes from highly processed meals, such breads, biscuits, sweets, and carbonated beverages (Tschirley, Haggblade, Reardon et al. 2015).

2.2.1.1 Whole cereals vs. refined cereals

Cereals and cereal products are staple foods in the majority of human diets worldwide, providing for a substantial proportion of dietary energy and nutrients (Laskowski, Górska-Warsewicz, Rejman, Czeczotko & Zwolińska 2019). The grain of any cereal is composed of three edible parts-the bran, the germ, and the endosperm. The bran, which is the multi-layered fibrous shell of the edible kernel, is rich in fibre, and contains antioxidants, B vitamins, minerals like zinc, iron, magnesium, and phytochemicals. The germ part of the seed that can grow into another grain plant, is rich in lipids and vitamins E and B, phytochemicals, and antioxidants. The remaining substantial portion of the kernel, endosperm, constitute carbohydrates, protein and smaller amounts of vitamins and minerals (Jones, Peña, Korczak & Braun 2015; Slavin 2004).

When some or all of the bran and germ parts of a grain, which are the most nutritious parts of the grain, are removed by milling, pearling, polishing, or degerming processes, it becomes refined grain (Jones et al. 2015). Refined grains, such as wheat flours, white rice, maize flour, and normal pasta have less nutrition content, a finer texture, and a longer shelf life.

Although there are marked differences between countries, cereals still constitute as much as 54% of all calorie sources in developing countries (Kearney 2010). Studies in Benin and Burkina Faso suggest that diets are largely traditional cereals while transitional diets are observed among a limited proportion of the population (Becquey, Savy, Danel, Dabiré, Tapsoba & Martin-Prével, 2010; Sodjinou, Agueh, Fayomi & Delisle 2009). In many African countries, coarse cereals, which are widely regarded as "*poor people's food*," like millet, sorghum, and maize are giving way to refined cereals like wheat and rice (Kaur, Jha, Sabikhi & Singh 2014). Me-Nsope (2014) found a positive correlation between the income per capita and the urbanisation rates and the share of rice in food diets in West African countries. In middle-income transitional Asian countries, cereal consumption has been observed to move away from the predominant rice-based consumption to wheat (Kearney 2010). Popkin (2015) notes that countries in Asia, the Middle East, North Africa, and urban Sub-Saharan Africa are experiencing a dietary shift towards the consumption of highly processed grains and carbohydrate-rich foods.

2.2.1.2 Fats and oils

Humans typically ingest four main kinds of dietary fats: monounsaturated (MUFA), polyunsaturated (PUFA), saturated (SFA), and trans-fat. MUFA are fatty acids with a single double bond, as opposed to polyunsaturated fatty acids (PUFA) that have two or more double bonds and saturated fatty acids (SFA) that have not (Öz, Ucak & Nayik 2022). MUFA can be found from olive, peanut, and canola oils, avocados, pumpkin, and sesame seeds (Öz et al. 2022). Sunflower, corn, soybean, flaxseed, and canola oils all have high polyunsaturated fat concentrations. Monounsaturated and polyunsaturated fats are both liquid at normal temperature. Saturated fat is mostly found in animal products (such as beef, milk, and butter), but it is also present in lesser amounts in a few plant products, including coconuts, coconut oil, palm oil, and palm kernel oil. Trans-fats are often created by an industrial process that involves heating liquid vegetable oils, while adding hydrogen to solidify the oil (FAO 2010).

The emergence of effective oil extraction technology in the US and Japan led to a sharp rise in the consumption of vegetable oils, which became a significant contributor to dietary change in higher income nations from the 1950s to the 1980s and subsequently in low- and middle-income countries (Popkin 2009). According to Drewnowski and Popkin (1997), the nutrition transition in developing countries started with a rise in the consumption of vegetable oils rather than animal goods like milk and meat.

Recent important trends in food consumption in lower- and middle-income nations include the per capita supply of dietary energy with an ever-increasing percentage of fats and oil and a declining share of starchy staples (Maletta 2014). The per capita daily fat supply in West African nations grew from 46g in 1990 to 61g in 2010, according to the FAO's food balance sheets. In South Africa, between 1975 and 2005, the proportion of fats in total energy consumption rose from 15% to 21% in rural regions and from 21% to 30% in urban areas (Vorster et al. 2011: 429-441). The principal drivers of this increase are plant fats, chiefly vegetable oil (Popkin, 2009). The expert consultation convened by the FAO recommended that total fat should constitute between 20% to 35% of the total energy intake for an acceptable macronutrient distribution range (FAO, 2010). However, the experts also recommended that the upper-level fat intake should not exceed 30% of the energy for individuals engaged in moderate activities. Each year industrially processed trans-fats, which are routinely present in packaged foods, baked goods, cooking oils, and spreads, cause up to 500 000 premature deaths from coronary heart disease globally (WHO 2023).

2.2.1.3 Animal source foods (ASF)

Between 1990 and 2018, the global intake of ASF has increased substantially, processed meat (152%), eggs (141.4%), milk (98.6%), unprocessed red meat (88.1%), and cheese (56%) (Miller, Reedy, Cudhea, Zhang, Shi, Erndt-Marino, Coates, Micha, Webb, Mozaffarian & Global Dietary Database 2022). According to

Popkin and Hawkes (2016), there has been a significant growth in the production and consumption of beef, pig, poultry, dairy products, and eggs in low- and middle-income nations. This is especially true in China and East Asia, where the consumption of pork and eggs has increased dramatically. In India, there has been an increase in the consumption of dairy products, but not meat, due to the cultural practice of vegetarianism among some sections of the community (Godfray, Aveyard, Garnett, Hall, Key, Lorimer, Pierrehumbert, Scarborough, Springmann & Jebb 2018). The rapid surge in the demand and production of meat, poultry, fish, and milk in low-income developing nations has been referred to the "*animal source foods revolution*" (Popkin 2009; Delgado 2003).

Contrary to the global trend, meat consumption in Africa has remained relatively low and on a decline in some countries (Godfray et al. 2018; Miller, Reedy, Cudhea, Zhang et al. 2022). According to FAOSTAT statistics, Africa's average per capita meat consumption increased from 14.71kg per capita in 1990 to 16.7kg per capita in 2020, a 14% rise during a 30-year period (FAOSTAT 2020). On the other hand, data published by the South African government show that from 2003 to 2015, total meat consumption in South Africa climbed by 54.4% to 66.83kg per capita, indicating that the trend in South Africa has not stalled as in the rest of Africa.

The rising consumption of ASF has both positive and negative consequences for public health. For people suffering from severe undernutrition, increased consumption enhances micronutrient intake required to achieve human development potential (Neumann, Harris & Rogers 2002); nevertheless, excessive consumption is associated with increased fat intake, which may raise the risk of mortality (Sinha, Cross, Graubard, Leitzmann & Schatzkin 2009). The systematic review and meta-analysis of prospective studies conducted by Farvid, Sidahmed, Spence, Mante Angua, Rosner and Barnett (2021) revealed that excessive red meat consumption is positively associated with the risk of breast cancer, endometrial cancer, colorectal cancer, colon cancer, rectal cancer, lung cancer, and hepatocellular carcinoma, while excessive processed meat consumption was found to be positively associated with the risk of breast, colorectal, colon, rectal, and lung cancers.

2.2.1.4 Ultra processed foods (UPF) and sugar-sweetened beverages (SSB)

The NOVA system devised by Monteiro, Cannon, Levy, Moubarac, Jaime, Martins, Canella, Louzada & Parra (2016) classifies foods and food products according to the level and purpose of processing. This results in four groups according to the extent and purpose of processing applied to preserve, extract, modify or create them:

- unprocessed or minimally processed foods
- processed culinary ingredients.
- processed food-simple products made by adding sugar, oil, salt, or other group 2 substances to group 1 foods.
- ultra-processed food (UPF) and beverage products-that are industrial formulations typically with five or more and usually many ingredients (Monteiro, Levy, Claro, Castro & Cannon 2010). According to the NOVA classification, the most common UPF and beverages are carbonated soft drinks; sweet, fatty, or salty packaged snacks; candies (confectionery); mass-produced packaged breads and buns, cookies (biscuits), pastries, cakes and cake mixes; margarine and other spreads; sweetened breakfast ‘cereals’ and fruit yoghurt and ‘energy’ drinks; poultry and fish ‘nuggets’ and ‘sticks’; sausages, burgers, hot dog sausages, and other reconstituted meat products (Monteiro, Cannon, Lawrence, Costa Louzada & Pereira Machado 2019).

High consumption of UPFs and SSBs, as well as significant declines in physical activity, are defining characteristics of the nutrition transition (Popkin & Ng 2022). UPFs are created by combining a variety of cheap industrial sources of dietary energy and nutrients with additives (Monteiro, Cannon, Moubarac, Levy, Louzada & Jaime 2018). They contain a lot of energy, unhealthy fats, refined carbohydrates, free sugars, and salt and are poor sources of protein, dietary fibre, and micronutrients. UPFs are designed to be hyperpalatable, visually appealing, have a long shelf life, and be consumed anywhere, at any time, which is further promoted by intensive social marketing (Monteiro et al 2018).

UPFs dominate the food supplies of high-income countries, and that their consumption is now rapidly increasing in middle-income countries (Monteiro, Moubarac, Cannon, Ng & Popkin 2013). Consumption of SSBs is rising in the majority of low- and middle-income nations while steadily declining in high-income countries (Development Initiatives 2018; Popkin & Hawkes, 2016). In contrast to the trend found in high-income nations, the highest consumption of SSBs is reported in low- and middle-income countries among persons with lower socioeconomic level (Lobstein 2014).

Studies demonstrate the existence of significant positive association between a high intake of UPFs and SSBs and the development of obesity (Valicente, Peng, Pacheco, Lin, Kielb, Dawoodani, Abdollahi, & Mattes 2023; Malik, Pan, Willett & Hu 2013; Forshee, Anderson & Storey 2008; Vartanian, Schwartz & Brownell 2007). Monteiro (2009) contends that food processing, rather than the overall nutrient composition or food intake patterns, drive the obesity epidemic, which is supported by a review of prospective cohort studies involving more than 1 million people (Dicken & Batterham 2021). The association between UPF and SSB consumption and NCDs is clearly established by multiple studies (Lane, Davis, Beattie, Gómez-Donoso, Loughman, O'Neil, Jacka, Berk, Page, Marx & Rocks 2021; Jardim, Costa, Pessoa & Duarte 2021).

2.2.2 The overweight and obesity dynamics

Obesity is a significant contributor to the development of hypertension, diabetes, coronary heart disease, certain cancers, and poor mental health (Ayton & Ibrahim 2019). Baba, Nagashima and Inasaka (2009) explain that weight gain is caused by an energy imbalance caused by an excess of high-calorie meals (high energy intake) and sedentary lifestyles or a lack of physical activity (low energy expenditure). Obesity is primarily driven by food system changes that result in more processed, inexpensive, and highly promoted foods (Swinburn et al 2011). Consuming UPFs high in sugars and saturated fat has been linked to an increased risk of weight gain and obesity (Mendonça, Pimenta, Gea, de la Fuente-Arrillaga, Martinez-Gonzalez, Lopes & Bes-Rastrollo 2016).

People's increased participation in industrial and service sectors that use machines and labour-saving technology, access to household technologies (e.g., electricity, piped water, appliances), and motorised transportation are key drivers of a sedentary lifestyle (Popkin 2015). Sedentary behaviour (an immobile condition of the body resulting in energy expenditure near to the resting metabolic rate) is a risk factor for obesity (Sedentary Behaviour Research Network 2012). Obesity is connected with middle-aged persons (particularly women) from rich, metropolitan surroundings in low-income nations (Swinburn et al 2011).

2.2.3 Concurrent transitions to the nutrition transition

Popkin (1993) contends that nutrition transition influences and is influenced by demographic and epidemiologic transitions. The nature and rate of nutritional change are determined by the interaction of these epidemiologic, socioeconomic, and demographic changes (Popkin 2008). In these concurrent and dynamically influenced transitions, the emphasis is on how populations move from one pattern to the next.

2.2.3.1 The demographic transition

The demographic transition is a phenomenon and theory that refers to the historical shift from high birth rates and high death rates in pre-modern social and economic development to low birth rates and low death rates in post-modern the period of social and economic development (Kirk 1996). The decline in death and birth rates that occurs during the demographic transition alters the age structure in such a way that the proportion of working and dependent populations changes. Initially, the child dependency ratio or youth bulge increases, followed by a demographic bonus period characterised by a ballooning of the working-age population, and finally by an ageing population (Weeks 2014). The physical and psychological needs associated with ageing are expected to have a significant impact on dietary patterns (Popkin 2008). In developing countries where dietary patterns differ greatly between urban and rural areas, rural-urban migration, a key variable in population dynamics, has a significant impact on adopting the dietary patterns of their destination (Popkin 2008).

2.2.3.2 The epidemiologic transition

The epidemiologic transition is related to demographic transition and nutrition transition (Popkin 2008). As the demographic transition is measured in terms of reduced infant mortality and increased life expectancy, the rising number of surviving seniors increases the prevalence of NCDs. According to Omran (1971), the theory of epidemiologic transition focuses on the complex shift in patterns of health and illness, as well as the linkages between these patterns and their demographic, economic, and sociologic antecedents, and consequences. In his seminal paper, Omran (1971) originally proposed three successive stages of epidemiologic transition. The first stage called "*Age of Pestilence and Famine,*" is characterised by high and fluctuating mortality rates mostly related to infectious diseases, malnutrition and famine, variable, and low life expectancy (between 20 to 40 years).

The second stage named "*The Age of Receding Pandemics*" is characterised by progressive decline of mortality as epidemics occur less frequently and increased average life expectancy (30 to 50 years) which led to sustained population growth which eventually becomes exponential. The third phase termed as "*Age of Degenerative and Man-Made Diseases*", is characterised by the replacement of infectious disease pandemics as major causes of death by degenerative diseases, cardiovascular disease (CVD), cancer, violence, accidents, and substance abuse. At this stage, with declines in mortality rates, average life expectancy increases to more than 50 years. Popkin (1994) suggested a five-stage of nutrition transition whereby at the later stages, individuals undergo changes in their diet and lifestyle to reverse the degenerative diseases represented in Omran's third stage and prolong a healthy lifespan. Recognising the complexity of the dynamics, Olshansky, Carnes, Rogers and Smith (1998) propose two additional stages: the age of delayed degenerative diseases and the age of emerging infectious diseases.

The epidemiologic transition model was developed and tested in the context of the experiences of Western countries. There are indications that it may not perfectly predict the health and disease pattern in the African context, that have quite different social, economic, political, cultural, and demographic contexts that relate to the health, disease, and mortality environments (Defo 2014). This is particularly true in the context of three types of health problems Africa is facing HIV/AIDS and re-emerging infectious diseases such as tuberculosis, malaria, malnutrition, emerging chronic diseases, accidents, and mental disorders (Defo 2014). Evidence from Sub-Saharan African countries suggests that changes in mortality and disease patterns are characterised by reversals, partial changes and simultaneous occurrence of diverse types of diseases (Masquelier, Waltisperger, Ralijaona, Pison & Ravélo 2014; Bawah, Houle, Alam, Razzaque, Streatfield, Debpuur, Welaga, Oduro, Hodgson, Tollman, Collinson, Kahn, Toan, Phuc, Chuc, Sankoh, & Clark 2016; ; Kahn, Garenne, Collinson & Tollman 2007; Moser, Shkolnikov & Leon 2005). COVID-19, which was declared as pandemic by WHO (2020c), has further thrown the epidemiologic transition theory into doubt. The virus invaded practically every country on the earth, even those that were in advanced or initial stages of epidemiologic transition.

Despite the above misgivings, the prevalence of non-communicable diseases is anticipated to rise in the light of the increasing "Westernisation" of people's diet and lifestyle changes, particularly in the urban setting of Sub-Saharan Africa (Mufunda, Chatora, Ndambakuwa, Nyarango, Chifamba, Kosia & Sparks 2006)

2.3 THEORETICAL FRAMEWORK

This study sought to identify the characteristics of the nutrition transition in Ethiopia using Popkin's nutrition transition model as a basis. As illustrated in Figure 2.1, Popkin

(2001) proposes five broad nutrition patterns that are not restricted to particular periods of human history as they continue to characterise certain geographic and socioeconomic subpopulations.

- The first pattern (collecting food) is characterised by hunter-gatherer populations having elevated levels of activity and low levels of obesity, eating diets rich in carbohydrates and fibre and low in fat, especially saturated fat (Popkin 2001).
- The second pattern is known as famine, which is characterised by much less varied diets and times of extreme food scarcity. Researchers believe that this stage was accompanied by nutritional stress and a decrease in height from the earlier hunter-gatherer or food-gathering stage (Popkin & Ng 2022).
- A rise in the consumption of fruit, vegetables, and animal protein and a decline in the importance of starchy staples in the diet characterise the third pattern, known as receding famine. The third pattern sees a change in activity patterns as more people start to engage in leisure and inactivity (Popkin 2001). Stunting is steadily declining in regions with elevated levels of the double or triple burden of malnutrition (Popkin, Corvalan & Grummer-Strawn 2020).

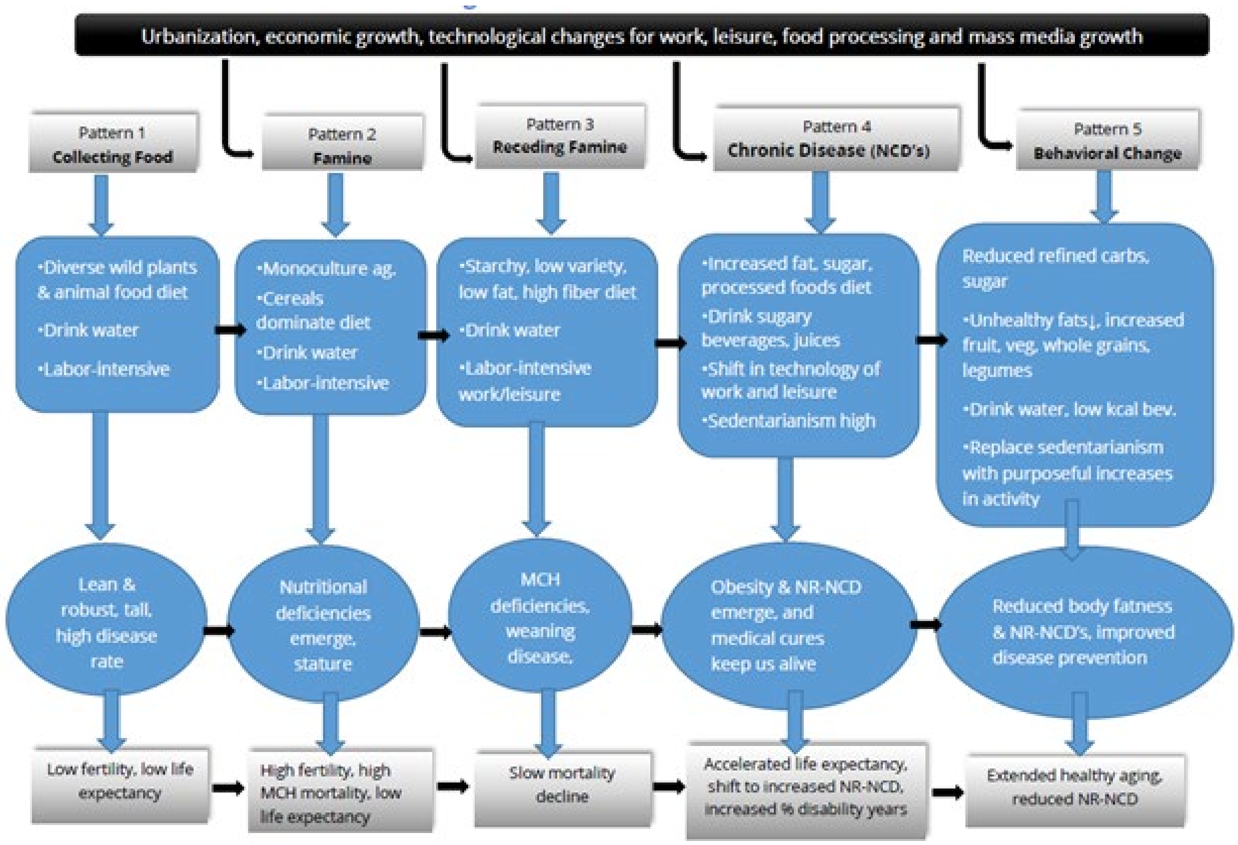


FIGURE 2.1: STAGES OF THE NUTRITION TRANSITION

Source: Popkin (2006)

- The fourth pattern is nutrition related NCDs, which is characterised by the consumption of a diet high in total fat, cholesterol, sugar, and other refined carbohydrates, and which are low in polyunsaturated fatty acids and fibre, and are often accompanied by an increasingly sedentary life, which may increase the prevalence of obesity and contributes to the degenerative diseases (Popkin & Ng 2022).
- The recently emerging fifth pattern, known as behavioural change, is characterised by reverting to whole and minimally processed foods that resemble the dietary intakes in stage 1 with a higher share of plant-based foods and nutrients (for example, fruit, vegetables, beans, and other complex carbohydrates) and lower intakes of refined foods, meat, and UPFs (Popkin & Ng 2022). Popkin and Ng (2022) contend that by combining the efforts of individuals, small groups, civil

society organisations, governments, and international organisations, it is possible to skip stage 4 and move on to stage 5, although it is challenging.

Popkin's nutrition transition model is criticised for being overly simplified (Hawkes 2006). There is insufficient evidence supporting the assumption that all countries will pursue the linear and progressive pathway from pattern 1 to pattern 5. Lang and Rayner (2007) are of the opinion that the nutrition transition should be unbundled into three overlapping, interacting, and reinforcing transitions of diet, human interface with the physical environment, and culture.

Despite Hawkes' (2006) misgivings, the researcher found the model to be a useful framework from which to look at a progression from pattern three to pattern four and then to pattern five and to test how Popkin's model fits into the empirical data of urban Ethiopia. Accordingly, the researcher made the study policy relevant as the analyses help to pinpoint the necessary policy actions to prevent or delay the possible detrimental consequences of dietary changes.

The dietary transitions taking place are deeply rooted in the processes of globalisation (Hawkes 2006). The impacts of globalisation on developing countries manifest *inter alia* in changing diets, lifestyles, altering demographic and economic conditions, and constraining good governance in the area of health in ways that promote obesogenic environments (Walls, Baker & Parkhurst 2018; Blouin, Chopra & Van der Hoeven 2009). Hawkes et al (2007) attribute the effects of globalisation on the nutrition transition to:

- the increase in activities by transnational food companies.
- the development of transnational supermarkets.
- the liberalisation of foreign direct investment.
- global food advertising and promotion
- the liberalisation of the international food trade.
- the liberalisation and commercialisation of domestic agricultural markets.
- technological developments and

- cultural influences.

These factors bring about dramatic changes in the food system, including food production, procurement, distribution, and food trade in developing countries. Many of these changes in the food system are driven by the rapid population growth, urbanisation, growing wealth, changing consumption patterns, and globalisation as well as climate change and the depletion of natural resources (FAO 2018).

Proponents of neoliberalism argue that more liberalised global trades contribute to the improvement of food security (De Soysa & De Soysa 2018:88-106). The argument is that more open trade increases agricultural production, lowers the cost of food, and increases people's access to more diverse, nutritious foods. In addition, trade can increase incomes and stimulate the overall economic growth by encouraging agricultural production in areas with high potential. Despite these positive outcomes of globalised food system, the concomitant changes in dietary consumption patterns (from traditional staples to highly processed, high calorie, and poor-quality diets) may be a wide-reaching challenge for the state of food security, nutrition, and health. Schmidhuber and Shetty (2005) describe the change as a reduction in the number of food-poor suffering from hunger and chronic undernourishment, but an increase in the number of people affected by obesity and NCDs.

As the predicament associated with globalisation is becoming evident, the quest for sustainable food systems increases that deliver food security and nutrition for all in such a way that the economic, social, health and environmental sustainability for future generations are not compromised (FAO 2018). In other words, it is necessary to promote sustainable diets that have low environmental impacts (SFS Programme 2018). The concept of 'sustainability' is the principle adopted by the United Nations for the Global Sustainable Development Goals (SDGs) of 2015. However, the realisation of economic growth, which entails increased extraction, production, and consumption of natural resources that harmonise with environmental sustainability, does not seem tenable. The SDGs set, among others, to end malnutrition in all its forms (under SDG 2) and reduce premature deaths from NCDs by one-third (under SDG 3) by 2030. The SDGs also encourage large transnational companies to adopt sustainable practices and to support developing countries in strengthening their scientific and technological capacity. The power imbalance emanating from economic inequalities in favour of the global corporates is the key factor in governing the food system and poses a challenge for the realisation of sustainability. In the globalised world, transnational companies are richer and more powerful than most of the low-income country governments that are supposed to regulate them. Hence, the primary focus regarding consumers in these countries is not on the quality, safety, and price of their food, but on the technologies that could have unknown effects on human health and the environment (Oosterveer & Sonnenfeld 2012).

In response to the contemporary food system dominated by powerful corporates, alternative movements promoting local agri-food networks are gaining prominence. Food sovereignty, as a political stance in the global South, challenges the neoliberalist globalisation model that gives dominance to big global corporations in the food and agriculture system. The food sovereignty movement underpins the right to:

- Eat healthy and culturally appropriate foods.
- Promote acceptable and appropriate food production that is not dependent on imported agricultural inputs and is free from genetically modified organisms.
- Prevent the unnecessary dumping of food products and food aid on the local markets.
- Achieve sustainable development objectives by protecting and regulating domestic agricultural production and markets (Pimbert 2009:7).

Contrary to the contemporary concept of ‘food security,’ which emphasises access to food (from the local production or import), food sovereignty goes further and focuses on where that food comes from or how it is produced (Edelman 2013). Food sovereignty is undoubtedly based on food security, but with the longer-term objectives of sustainability and autonomy in the access, affordability, quality, and quantities of food in mind (Nilsson & Evengård 2015).

While the food sovereignty approach provides an alternative to highly processed diets, its implementation is highly questionable. For example, Gartaula, Patel, Derek & Moghariya (2013) contend that it is too ideological and fails to acknowledge the limitations of local actors or the complexity of local livelihoods. Mudombi-Rusinamhodzi and Rusinamhodzi (2022) argue that ecological intensification alone would not be able to solve the Sub-Saharan Africa problem, which is characterised by exceptionally low crop productivity and a rapidly growing population, making achieving food security without applying synthetic fertiliser and other agricultural inputs unlikely. Thus, the food sovereignty approach gives insufficient recognition to new knowledge about promoting sustainable development (Aerni 2011:23).

In this study, the nutrition transition in urban Ethiopia was analysed through the lens of Popkin's nutrition transition model, the contemporary discourses on globalisation and neoliberalism, the sustainable food system approach, and the idea of food sovereignty. These were theoretical basis that guided the study to understand, analyse, and design the ways the nutrition transition evolved over time and investigate relationships between factors. This approach helped to analyse the economic, social, health and environmental implications of the nutrition transition and identify potential entry points to prevent or delay the possible undesirable consequences of these changes.

2.4 CONCEPTUAL FRAMEWORK

Informed by the literature reviewed, the conceptual framework for this study aims to identify the determinants and the pathways for an array of factors, spanning from environmental to individual levels, to play a role in changing the amounts and types of food consumed in a population at a given point in time. The pathways, albeit non-exhaustive, of these factors are graphically illustrated in Figure 2.2. All the pathways indicated in the diagram are not explored in this study. The diagram is intended to show how the various factors are interrelated to trigger a nutrition transition that is manifested in the form of changes in dietary patterns and lifestyles that lead to obesity and overweight and nutrition related NCDs.

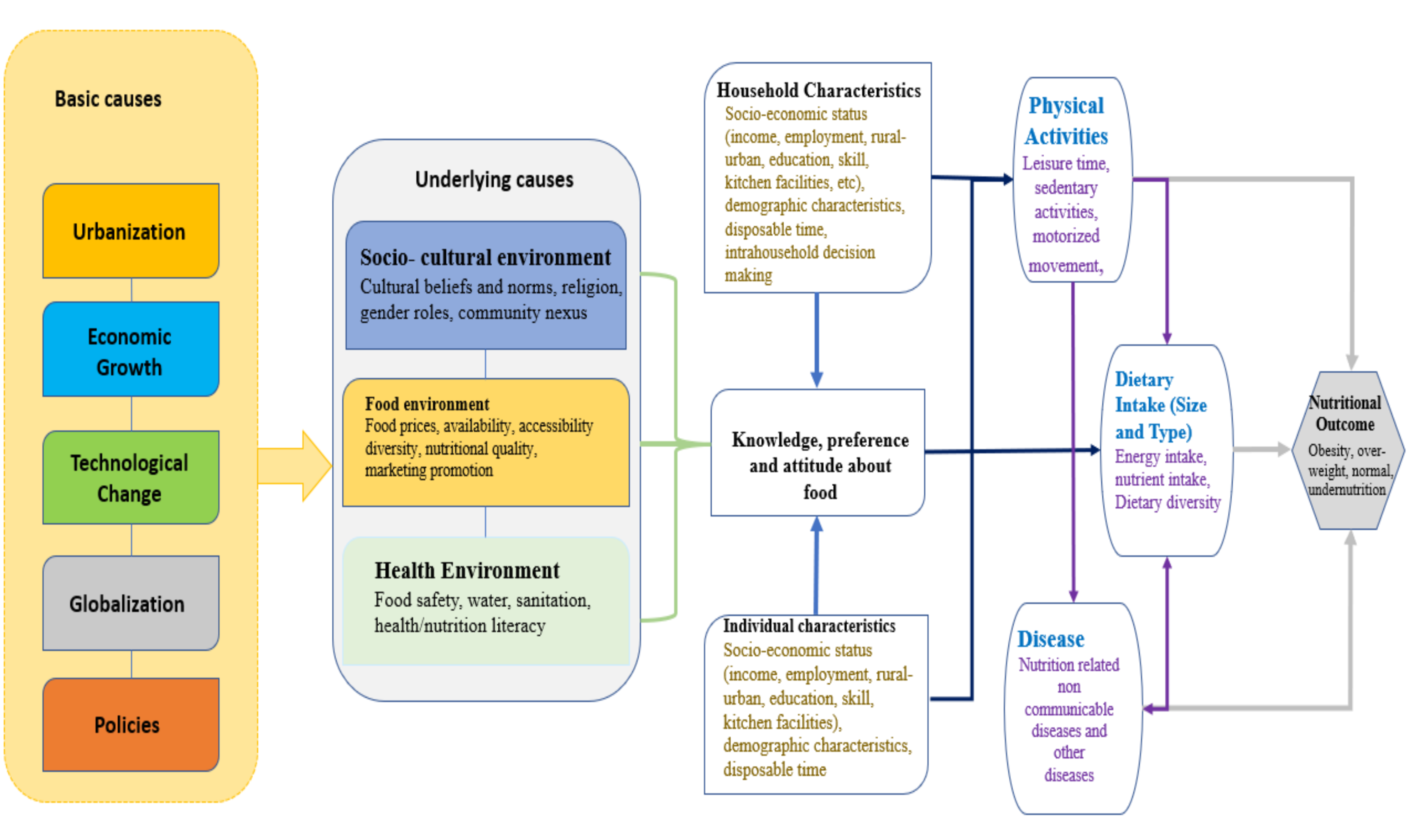


FIGURE 2.2: CONCEPTUAL FRAMEWORK OF THE STUDY

The critical underlying drivers of dietary and lifestyle changes are related to political, macroeconomic, and technological factors, which recognise the impacts of economic growth, urbanisation, technological changes, policies, and globalisation in shaping the food environment, health environment and socio-cultural environment explicitly. However, these factors are mutually reinforcing, and it is difficult to unravel the contribution of each factor separately.

Popkin (2006) elucidates the technological change pathway that is promoting a nutritional transition in two fundamental ways. First, the advancement of technology in producing and processing vegetable oils from high-yield oilseeds such as soybean, sunflower, rapeseed, palm, and peanut oil, as well as the refinement of high-quality vegetable oils. This permitted the increased availability and accessibility of low- and middle-income nations to inexpensive fats, one of the primary drivers of the dietary transition. The second pathway is associated with technology innovation, which permitted a shift in activity levels at work, travel, and leisure, as well as leisure sedentary behaviour-promoting equipment. For example, indoor water, washing machines, and other mechanical devices are replacing hard manual labour; televisions, laptops, note pads, and smart phones are replacing active recreation; walking and biking are being replaced by new forms of transportation (Popkin & Ng 2022)

The second driver of nutrition transition, urbanisation, tends to affect the food environment by making a wider variety of modern food items more accessible and by changing physical activities (Drewnowski & Popkin 1997; Hoffman 2001; Popkin 2004; Schmidhuber & Shetty 2005; Kearney 2010). Urban settings are generally associated with a food environment that has a wider availability of commercially processed food, sugar, fat, and salt. The wider availability of modern foods in urban settings is linked to an array of factors, including modern transportation and marketing systems, the heterogenous populations having different dietary habits, occupations that promote consumption outside the home; and diseases and use of health services (Popkin 2015). On the other hand, urban adults tend to expend less energy because of more sedentary jobs, reduced household chores due to the availability of electricity and water, and motorized transportation, and greater leisure time, more access to television, the internet and video games (Drewnowski & Popkin 1997).

The nutrition transition is also linked to another key driver, globalization, and the associated liberalization policy of trade between countries, which influences the food environment, socio-cultural environment and the health environment through supply and demand factors. Hawkes (2007) identifies the supply factors that increased the availability, accessibility, and acceptability of high-calorie, nutrient-poor processed foods as the growth of TFCs; international food trade liberalisation; global food advertising and promotion; supermarket development; cultural influences; foreign direct investment liberalisation; technological developments; and domestic agricultural liberalisation. On the other hand, Schrecker and Bambra (2015) and Thow (2009) describe the demand side of globalisation as linked to increased income and employment that, in turn, changes the desire to consume such foods. The impacts of globalisation thus promote an obesogenic environment by changing diets, affecting lifestyles, enhancing cross-culture perceptions, and altering demographic and economic conditions.

Economic growth, which can be viewed as an increase in the Gross Domestic Product (GDP), and the concomitant rise in income per capita, is the fourth underlying driver of the nutrition transition. The fall in real prices of some food items, accompanied by the improvement in living standards helps to facilitate increased access to packaged foods and beverages (Popkin 2015). The change in economic structure from a labour-intensive agrarian economy to an industrialised economy is associated with an increased a sedentary lifestyle (Paula & Margaret 2001). Increased formal labour force participation, which has reduced the time available to prepare meals, is another factor that leads people to resort to consume timesaving processed foods (Popkin & Ng 2022).

These drivers of nutrition transition tend to affect the food environment, the socio-cultural environment, and the health environment, which subsequently affects the food preference, knowledge, and attitude as depicted in Figure 2.2.

2.4.1 The food environment

According to Herforth and Ahmed (2015), the food environment refers to the availability, affordability, convenience, and desirability of various foods. The food environment has a significant impact on the types of foods that consumers may acquire, as well as their pricing and level of convenience (FAO, 2016; Herforth & Ahmed 2015). As a result, it affects both individuals and communities' food choices at any given time.

Locally produced staples and pulses are rapidly being replaced in developing nations by ultra-processed foods offered by multinational food corporations (Herforth & Ahmed 2015). Consumers can obtain food products through domestic manufacturers or by importing them from other countries. The locations where consumers may get these meals include supermarkets, small retail stores, wet markets, street food stalls, coffee shops, tea houses, school canteens, restaurants, and all other locations (FAO 2016).

Individual-level variables and the food environment influence one's food choices (Herforth & Ahmed 2015). Food availability through the aforementioned, therefore influences people's dietary preferences.

Food prices and food affordability are important determinants of the types of food consumed by households Da Silva, Tanmoy, Pragasam, Iqbal, Sajib, Mutreja, Veeraraghavan, Tamrakar, Qamar, Dougan & Bogoch 2022). The cost of the food may be prohibitive for people that have a lower level of income to buy expensive food items (Lima, Costa, Brandão & Rocha 2021). Low-energy, nutrient-dense meals that adhere to dietary recommendations are typically more expensive than high-energy, less-compliant items (Monsivais & Drewnowski 2009). People with lower socioeconomic positions typically choose foods that are more affordable and higher in energy (Darmon & Drewnowski 2015).

Governments use a variety of economic policy tools to affect prices and, in turn, consumer behaviour. These tools include taxes on particular types of food, such as ultra-processed foods, the exclusion of some commodities from the goods and services or value-added tax, and subsidies for specific goods (Lee, Mhurchu, Sacks, Swinburn, Snowdon, Vandevijvere, Hawkes, L'abbé, Rayner, Sanders & Barquera

2013). Numerous studies (Waterlander, Jiang, Nghiem, Eyles, Wilson, Cleghorn et al. 2019; Colchero, Rivera-Dommarco, Popkin & Ng 2017; Afshin, Peñalvo, Del Gobbo, Silva, Michaelson, O'Flaherty, Capewell, Spiegelman, Danaei & Mozaffarian 2017) contend that taxes on saturated fat, sugar, sweets, and salt, increased overall purchases of healthy foods.

As people spend a great deal of time working, they spend little time on food preparation which gives rise to fast-growing convenient foods, such as fast food, street food, and highly processed shelf-stable food (Herforth & Ahmed 2015). In addition, distance to a fresh food market can also prohibit people's access to food items. Food advertisements through a range of media play a critical role in shaping food-related knowledge, attitudes, preferences, and practices. The promotion of food items through television, the radio, social media, amongst others, facilitate the adaptation of globalised lifestyles easily, including changes in tastes and preferences for food. Hawkes (2006) points out that the food marketing promotion targets the young aggressively with the aim of influencing their consumption patterns that will carry into adulthood.

2.4.2 Socio-cultural environment

Socio-cultural factors, including social class, reference group, religion, traditions, beliefs, and values have a significant impact on shaping the food preference, preparation, and consumption (Mutsikiwa & Basera 2012; FAO 2016). The religious exclusion of different food items and restrictions to certain periods of time (for example, fasting) are important ways of influencing the dietary habits of people (Milford, Mouel, Bodirsky & Rolinski 2019). Food plays -a social or ceremonial role in many cultures, and certain foods are preferable and reserved for religious festivals, whereas some food items are associated with social positions (Reddy & Anitha 2015). Some cultures associate obesity with power, beauty, and affluence (Prentice 2006; Renzaho 2004). However, underpinned by globalisation, and urbanisation, and technological change, cultural norms, social relations, and consumption patterns may change as people adapt cross-cultural values, particularly regarding dietary consumption and physical activity.

2.4.3 Health environment

The health environment plays a specific role in influencing the type of food individuals and communities consume. Healthier food choices, consumption habits, and general nutrition are influenced by health and nutrition knowledge, education, and counselling during the course of a person's lifetime (Grace 2015).

2.4.4 Household and individual characteristics

Consumers make food choices based on their personal tastes, those of their households, and the resources at their disposal. According to the basic economic theory, the consumer is the fundamental economic unit that decides, which goods are bought and in which amounts. To maximise their utility or well-being, households spend their limited money on particular foods and other products (Liberto, 2023). According to the influential classic model developed by Becker (1965), a theory of Allocation of Time, the factors that guide these households/individuals' decisions, are the disposable income and the value of time for the household to purchase, prepare, consume, and clean-up after preparation food and consumption, prices, and availability of the items relative to other prices. Applying Becker's (1965) model, Bonke (1992) explores the impact of disposable income and time on food consumption patterns using empirical data from Denmark. He found that the rich and busy households tended to consume convenience foods, while the poor with a great deal of time, leaned towards cheap and non-convenience foods.

Even if a household is comprised of several different members, traditional economic decision-making household models treat a household as a single decision-making entity or an individual maximising a single utility function under a common budget constraint. This unitary approach assumes that only household decisions are made and one utility functions for the entire household, which can be calculated by pooling the incomes of all household members (Chiappori & Donni 2009; Donni & Ponthieu 2011). To address the limitations that emerge from aggregating individual preferences into a single entity, researchers are proposing alternative theoretical models. The novel approaches consider the existence of multiple decision-makers (individual household members) that are represented by distinct preferences within the same household under consideration (Donni & Ponthieu 2011). The models recognise that the decision-making process within the household is the result of bargaining between individual household members (Chiappori & Donni 2009). These models are known by different names, namely, collective, non-unitary, or intrahousehold bargaining models.

The decision for consumption of several types of food are influenced by many different socio-economic and demographic characteristics with regard to households / household members. These factors may include the level of education, income, age, gender, marital status, household size, employment status, knowledge, experience, control over household resources and intra-household decision-making, place of residence, or availability of kitchen facilities (Kaya 2016; Piernas & Popkin 2011; Wardle, Haase, Steptoe, Nillapun, Jonwutiwes & Bellisie 2004).

Household income and food costs are major factors affecting food choice, particularly for low-income customers. Bennett's (1941) law states that the consumption of starchy staples, such as cereals and root crops, is inversely related to income. This means that as the income level rises, so does the consumption of animal source foods and high-value crops, such as fruit and vegetables, rather than starchy staples, whose consumption falls. People with greater disposable incomes and higher levels of education tend to adopt new eating patterns at the family level, especially when convenience meals are accessible (Amuna & Zotor 2008).

The type of foods individuals buy are influenced by their income, but the urban food environment impacts how that income is spent on food, as well as people's attitudes towards it, preferences, and larger range of food options (Hawkes, Smith, Jewell, Wardle, Hammond, Friel, Thow & Kain 2015). Popkin and Ng (2022) contend that income growth, results in an increase in the total food consumed (expansion effect) and changes in what people eat and snack on (substitution effect), Based on the experience of Ghana, Ecker and Fang (2016) assert that an increased household income boosts people's ability to purchase a range of foods, which generally leads to a nutrition transition and the emergence of new nutritional concerns, such as an increase in the prevalence of overweight/obesity and related NCDs (Ecker & Fang 2016).

The level of education is considered as a key determinant of lifestyle including consumption behaviour, among others, as it has a key role in shaping the behaviour of people (Mirowsky & Ross 1998). Education is also instrumental in providing knowledge and skills that may help households to secure resources, including income (Woessmann .2015). An increased level of education is associated with an increased intake of lower-calorie foods that include more animal foods, fruit, and dairy, but fewer cereals (Streeter 2017).

Elderly people tend to have static food preferences that are usually limited to identifiable traditional boundaries, while the youthful ages tend to adapt to new foods, particularly with advertising targets the age group (Pingali & Yasmeen 2004). Households headed by women tend to consume diversified diets as compared to male-headed households (Akerele & Odeniyi 2015). A larger household size is associated with lower dietary diversity (Grobler 2015). According to Wiig and Smith (2009), characteristics including marital status, the existence of children in the household, and household members' health status may shape the food choices made at the household level. By regulating their children's food environment and serving as role models for eating behaviours, parents play a crucial part in influencing the consumption habits of their children (Pearson, Ball & Crawford 2012). The study conducted by Olson, Bove, and Miller (2007) indicates that food insecurity linked to poverty in childhood may motivate mothers and their offspring to overeat in adulthood, which may result in adult obesity.

In comparison with their rural counterparts, urban residents tend to consume a higher proportion of calories derived from fat, but lower proportion from cereals (Kelles & Adair 2009), more meat and other protein (except dairy, which is relatively higher in rural), more fruit and vegetables (Steyn, Bradshaw, Norman, Joubert, Schneider & Steyn 2006), more sugary snacks, away from homes, and processed foods (Huffman, Piwoz, Vosti & Dewey 2014).

2.4.5 Knowledge of, preferences for, and attitudes about food

Food choices are influenced by such factors as taste preference, knowledge, emotional states, and food preparation skills. Knowledge of nutrition is associated with healthier food choices (Mancino & Kinsey 2008). According to the meta-analysis conducted by Zhang, Zhang, Schwarzer and Hagger (2019), deliberate and planned eating is linked to the consumption of healthier diets, whereas intuitive eating is linked to the intake of less nutritious meals (König, Sproesser, Schupp & Renner 2021). The preference for sweet and high-fat foods appears to be innate (Drewnowski 1997). There is evidence suggesting that the taste preferences of infants can be influenced by the foods eaten by a woman during pregnancy and lactation (Birch 1999).

2.4.6 Nutrition-related non-communicable diseases (NCDs)

Obesity and overweight, the outcomes of the nutritional transition, are noted to lead to the development of nutrition related NDCs. According to the WHO (2020b), overweight and obesity are predisposing factors for cardiovascular diseases (mainly heart disease and stroke), diabetes, musculoskeletal disorders, and some cancers (including endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and colon). A multi-cohort meta-analysis indicated that mild obesity was linked with a loss of one in every ten potential disease-free years in middle and later adulthood, but severe obesity was associated with a loss of one in every four potential disease-free years (Nyberg, Batty, Pentti, Virtanen, Alfredsson, Fransson, Goldberg, Heikkilä, Jokela, Knutsson, Koskenvuo, Lallukka, Leineweber, Lindbohm, Madsen, Magnusson Hanson, Nordin, Oksanen, Pietiläinen, Rahkonen & Kivimäki 2018).

2.4.7 Nutrition outcome

According to UNICEF’s (2010) conceptual framework for nutrition, the immediate determinants of nutritional outcomes are food consumption, care, and disease. In the conceptual framework of this study, in addition to dietary consumption and disease, the researcher has added the level of physical activity as a fundamental determinant of the nutritional outcome.

2.5 SUMMARY

This chapter sought to understand the extant theoretical and empirical evidence pertaining to the global nutrition transition and associated themes. The reviewed literature elaborated on the definition of nutrition transition, patterns of dietary shift, and lifestyle change underpinned by technological change. The demographic and epidemiologic transitions, which are moving in tandem with the nutrition transition, were explored based on global theoretical and empirical evidence. The theoretical frameworks described in the second section of the chapter established the theoretical foundations for explaining the study's findings in the subsequent chapters. Popkin's five-stage nutrition transition framework, the sustainable food system, and food sovereignty were chosen as theoretical frameworks for analysing the study's findings. The following section of the study's conceptual framework depicted the pathways through which distinct factors are interconnected to prompt nutrition transition. Some of the global, continental, and country specific data were transferred for discussion in the next chapter as these data are more appropriately placed there to compare the situation elsewhere with the situation in Ethiopia.

CHAPTER 3: CONTEXTS OF THE STUDY SETTING

3.1 INTRODUCTION

Ethiopia, with a total size of 1,104,300 square kilometres, is the 27th largest country in the world and the 10th largest in Africa (United Nations Statistics Division 2016). According to the *World Development Indicators* (WDI) dataset, possessing an estimated 103.6 million inhabitants in 2016, Ethiopia is the second largest populous country in Africa, after Nigeria, and the 13th most populous country in the world. The principal religions practised in Ethiopia are Orthodox Christian (43.5%), Muslim (33.9%), Protestant (18.5%), traditionalist (2.7%), and Catholic (0.7%) (CSA 2010). Ethiopia has undergone significant socio-economic and demographic changes over the last two decades that are likely to shape the dietary consumption patterns and lifestyles of the people and to lead to the process known as the nutrition transition. As pointed out in the previous chapter, the nutrition transition is usually associated with urbanisation, income growth, changes in the food system, changes in the age structure of the population and changes in lifestyles (Popkin 2006b).

In this chapter, the researcher provides the background to the demographic transition, the epidemiologic transition, the economic transition, inflation and the price trends of important food items/groups, urbanisation, the supply of different food items/groups, nutrition-related programmes, and policies related to production, procurement, and safety of food in Ethiopia. Understanding the patterns of change in these precursors in recent times, is central to designating whether the overall environment is conducive for nutrition transition to take place. The data presented and discussed in this chapter are key to interpreting the results of the study in the subsequent chapters.

The analysis in this chapter is based on secondary data obtained from diverse sources. Secondary data published by the National Bank of Ethiopia (NBE), the Central Statistical Agency of Ethiopia (CSA), the World Bank, the Food and Agriculture Organization (FAO), the World Health Organization (WHO), and the United Nations Population Division are analysed further and presented in graphs and tables. When appropriate, the Ethiopian data have been compared with the data for other countries or regions that are at distinct stages of the nutrition transition.

3.2 THE DEMOGRAPHIC TRANSITION IN ETHIOPIA

The WDI data indicate that the population size of Ethiopia had increased from 66.2 million in 2000 to 103.6 million in 2016. This means that the population of Ethiopia has increased by 37.4 million or by 56.5% over 16 years. Ethiopia represents 1.4 % of the global and 8.5% of the sub-Saharan African population. The median age of Ethiopian population increased from 17 years to 18.9 years during the same period, implying that Ethiopian population is progressing from a "very young"[1] to a "youthful"[2] age structure. The youthful population structure introduces challenges for the country, particularly in terms of education and employment opportunities. As illustrated in the population pyramids, the proportion of males and females under the age of ten years has decreased while the share of the cohorts aged 15 years and over, including those above 70 and above, increased between 2000 and 2016.

The share of the population of a working age (15-64) has expanded from 50% to 55% during the same period. On the other hand, the share of children under 15 years of age declined from 46% to 42%. Over the period between 2000 and 2016, Ethiopia saw a decline in the dependency ratio from 98 to 82, largely driven by the decline of youthful age dependency, while old age dependency increased slightly. This situation may lead to an increased labour supply, increased savings and investments, and a larger output (Bloom, Canning & Sevilla 2003). If optimal policy tools and investments are put in place during this time, the situation may open the window of opportunity for a "demographic dividend" – a situation whereby a larger cohort of potentially economically active people exist and are no longer smaller than the birth-to-end-of-school ages (Bloom & Canning 2011). On the other hand, if the situation is not handled

[1] A very young age structure refers to a population where two-third or more are aged below 30 years (Madsen, Daumerie & Hardee 2010).
[2] A youthful age structure refers to a population that have started undergoing a demographic transition but has 60 % or more of people aged below 30 years (Madsen et al 2010).

appropriately, the situation may give rise to violence and social conflict under certain social, economic, and political conditions (Urdal & Hoelscher 2009; Cincotta, Engelman & Anastasion 2003). The youth bulge in Ethiopia, and these possible consequences have implications for food production, diets, and energy needs. As the rural youths migrate to urban areas in search of jobs, they are likely to adapt new lifestyle and food habits (for example., street food and fast food, or meals in institutional canteens). The youth are likely to be influenced by peer pressure, food marketing, which typically promotes highly processed, energy dense, “empty calorie” foods (Popkin, Badair & Ng 2012; Marcus 2013).

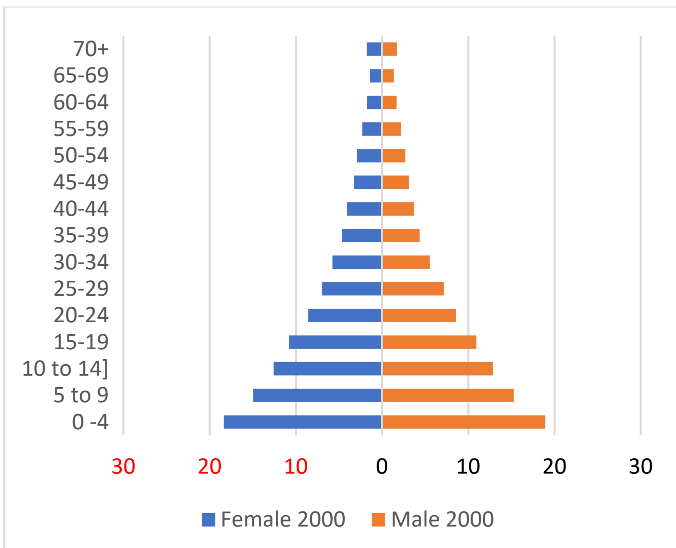


FIGURE 3.1a: POPULATION PYRAMID OF ETHIOPIA, 2000

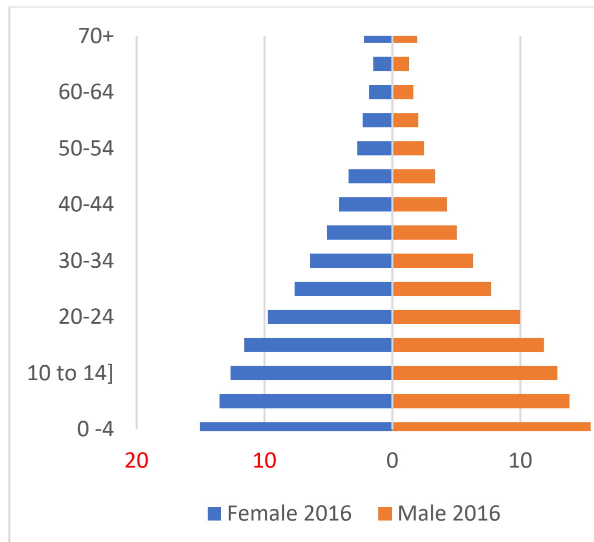


FIGURE 3.1b: POPULATION PYRAMID OF ETHIOPIA, 2016

Source: *Constructed based on the data extracted from World Development Indicators*

According to the Ethiopian Demographic and Health Survey (DHS), the total fertility rate (TFR), the average number of children per woman over the course of her lifetime, that stood at 5.5 children per woman in 2000, has declined progressively and reached 4.6 children per woman in 2016, suggesting that the fertility level is still extremely high even when compared to the average for Sub-Saharan Africa (4.7 children) and more than double of the replacement level. Although fertility has already started declining, the pace of decline is slow as is the case in sub-Saharan Africa, leading to high youth dependency. Bongaarts and Casterline (2013) indicate that the early stage of fertility transition may be associated with poor social and economic development and weaker family planning programmes. Urban Ethiopia saw an accelerated reduction in the TFR from three children per woman in 2000 to 2.3 children per woman in 2016 (CSA & ICF 2017). The fertility level in urban Ethiopia is only slightly above the replacement level. The case of Addis Ababa is unique specifically because it had registered a TFR below the replacement level since the first DHS in 2000. However, the urban population is increasing at a higher rate of growth due to the rural-urban migration, the population momentum, and the increase in life expectancy.

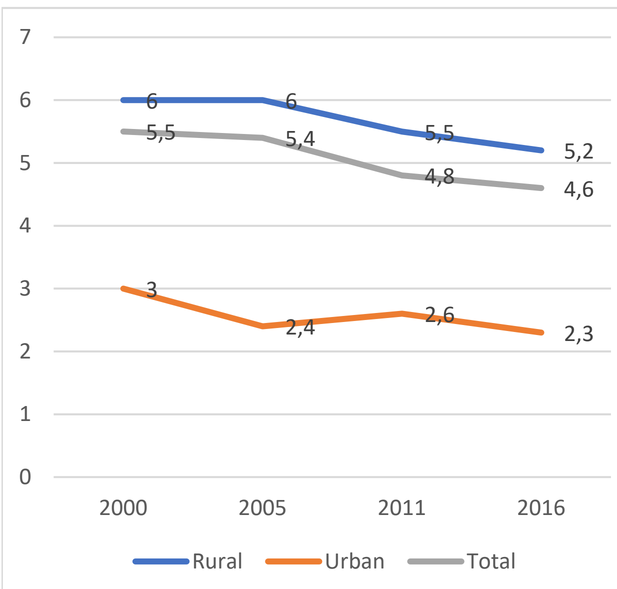


FIGURE 3.2: TRENDS IN THE TFR, ETHIOPIA, 2000-2016

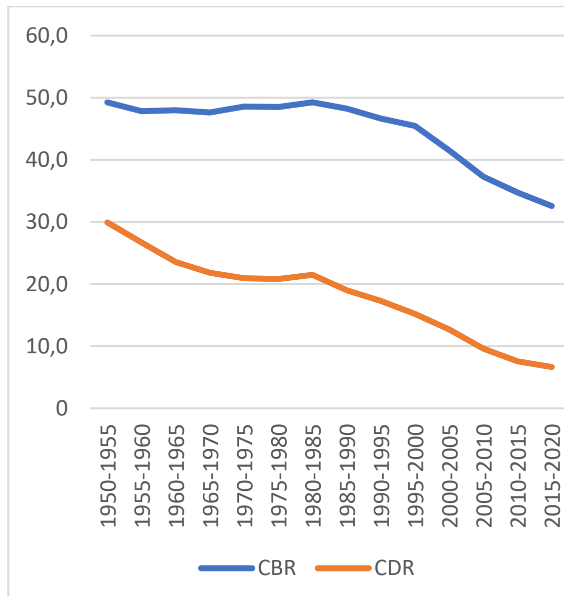


FIGURE 3.3: TRENDS IN THE CRUDE BIRTH RATE AND CRUDE DEATH RATE, ETHIOPIA

Source: EDHS and UNDP (2020)

The EDHS data suggest that the under-five mortality, a key determinant of the demographic transition, declined from 166 deaths per 1 000 live births in 2000 to 67 deaths per 1 000 live births in 2016, signifying a decline of 60%. Infant mortality also declined from 97 deaths per 1 000 live births in 2000 to 48 deaths per 1 000 live births in 2016, which represents a decrease of 50%. The steady and substantial decline of child mortality achieved since 1990 helped Ethiopia to achieve the Millennium

Development Goal related to child survival (MDG 4). This may be attributable to the heavy investment by the government of Ethiopia in the health infrastructure and the training of health professionals and tailored community-based child survival interventions. The estimates by the United Nations suggest that the crude death rate, which was around 29.9 per 1 000 in 1950 to 1955, declined to 12.7 per 1 000 in 2000-2005 and 6.7 per 1 000 in 2015 to 2020. The registered decline in mortality rates, particularly the significant drop in infant mortality and child mortality rates, led to an increase in the life expectancy of the population in the country. According to the estimates by the UNDP (2020), the life expectancy at birth, which was stalling at 38 years in 1960, had reached 52 years in 2000 and progressed to 66 years in 2016. This means that over the 16-year period between 2000 and 2016, the average life expectancy at birth has increased by 27%, or the life expectancy at birth had been increasing by about 0.87 years per year. As reflected in the EDHS, improvements registered in nutrition, sanitation, and malaria prevention and control measures may have contributed to the remarkable progress in reducing mortality that led to substantial increases in lifespans.

Like the nutrition transition, the demographic transition theory suggests that future population growth will develop along predictable four- or five-stages (Caldwell et al., 2006). The model depicts the stages according to which societies shift from high birth rates and high mortality rates in low socio-economic development situations to low birth rates and low death rates as their level of development advances. From the above analysis, Ethiopia has already passed the pre-modern stage, where there is a balance between the birth rate and the mortality rate and progressed to the second stage of the demographic transition known as “urbanising/ industrialising.” The population dynamics in the country, which is characterised by high but declining fertility rates and an increase in life expectancy because of declining mortality rates gives rise to a rapid, but declining population growth rate. The population growth that was accelerating at the rate of 3.6% per annum in 1992 plummeted to 2.9% per annum in 2000 and further slowed down to 2.6% per annum in 2018, suggesting that the demography is on its way to the next stage of demographic transition, “mature.” The “urbanising/ industrialising” stage is characterised by improvements in the food supply, brought about by higher yields as agricultural practices are improved, and significant improvements in public health that reduce mortality, particularly in childhood (Montgomery n.d., as cited in Weickert 2012). An analysis of the pattern of demographic transition in Ethiopia, indicates that there is distinct difference between the rural and the urban population. The demographic transition in urban Ethiopia is advancing as the fertility level is extremely low (in some cases below replacement level) and the proportion of the working age population is ballooning. As noted by Popkin (2008), a demographic transition occurs in tandem with a nutrition transition, despite that fact that the exact pathway is not clear. However, it is likely that the changes in the population age pattern associated with the demographic transition in Ethiopia is likely to induce changes in dietary patterns.

3.3 THE EPIDEMIOLOGIC TRANSITION IN ETHIOPIA

As mentioned in the previous section, Ethiopia has experienced a significant decline in mortality and life expectancy rates have increased significantly over the past two decades. Although the measures of mortality, including the infant mortality rate, the child mortality rate, the crude death rate, and the maternal mortality rate, are in a downward trajectory, Ethiopia still has one of the highest mortality figures among the countries of Africa. The absence of a vital registration system coupled with the fact that most deaths occur at home, is a critical deterrent factor to a nuanced understanding of transition patterns and variations across various parts of the country over time. The data on morbidity outcomes in various parts of Ethiopia are mostly obtained from individual hospital records or verbal autopsies, which are based on a small number of patients (Anteneh, Araya & Misganaw 2013).

The study based on the Addis Ababa Mortality Surveillance Program verbal autopsy data spanning between September 2006 and December 2009, suggested that 51% of deaths in Addis Ababa were attributed to noncommunicable diseases, while communicable diseases and injuries represented 42% and 6%, respectively. The study further suggested that the leading causes of death in the city are cardiovascular diseases (24%); HIV/AIDS (19%), tuberculosis (12%), malignant neoplasm (10%); digestive system diseases (9%), diabetes (5%), respiratory diseases (3 %) (Misganaw, Mariam & Araya 2012). Evidence from the health and demographic surveillance conducted in the Dabat woreda between 2007 and 2013 suggest that communicable diseases constitute 48% of the total deaths, while NCDs and external causes comprise 35% and 10%, respectively (Kebede, Andargie, Gebeyehu, Awoke, Yitayal, Mekonnen, Wubshet, Azmeraw, Lakew & Alemu 2017).

According to WHO (2018 b) estimates, in Ethiopia, the percentage of deaths caused by NCDs increased from 34% in 2010 to 39% in 2016. Of all the deaths caused by NCDs in Ethiopia in 2016, the most important are cardiovascular diseases (16%), cancers (7%), chronic respiratory diseases (2%), diabetes (2%), and other NCDs (12%). Communicable, maternal, perinatal, and nutritional conditions were reported to be the causes of 49% of deaths in the year. There is evidence showing that water and sanitary conditions, significant causes of illness and death from infectious diseases, are improving in Ethiopia. According to EDHS, households with access to safe drinking water increased from 25% in 2000 to 65%. In 2016, access to drinking water from improved sources is nearly universal (around 97%) in urban Ethiopia. Rural households that have access to proper toilets (flush toilets or pit latrines) increased from 8% in 2000 to 60% in 2016 (CSA & ICF 2016). The training and deployment of health extension workers in every rural Kebele to provide a primary health care service is also another probable reason for the decrease in communicable diseases in rural Ethiopia. Given the link between early childhood nutritional deprivation (foetal and post-natal growth retardation) and the development of NCDs later adult disease (Baker 1995; Vorster, Bourne, Venter, Oosthuizen 1999), the pervasive level of malnutrition in the previous years may be a cause of concern for the increased risk of NCD occurring now.

The Global Burden of Disease (GBD) study also provided model-based estimations of causes of death by age, sex, and year, numbers of deaths and rates of years of life lost (YLL) due to communicable, maternal, neonatal, and nutritional (CMNN) disorders, NCDs, and injuries for the period between 1990 to 2015. Between 1990 and 2015, the ages of standardised deaths caused by CMNN fell at a faster rate (65%) as compared to those of deaths caused by NCDs (37%). The NCDs that were in the top ten age standardised causes of death, increased from four in 1990 to six in 2015. The NCDs in the top ten in 2015 are ischemic heart disease, haemorrhagic stroke, ischemic stroke, other cardiovascular, diabetes, and hypertensive heart disease (Misganaw et al. 2017).

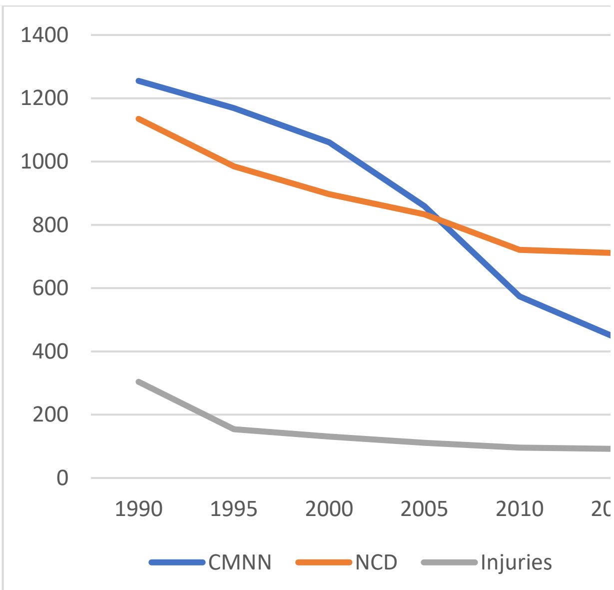


FIGURE 3.4a: LEVELS AND TRENDS IN AGE-STANDARDIZED DEATH RATES PER 100 000 BY MAJOR CAUSES FOR BOTH SEXES AND ALL AGE GROUPS IN ETHIOPIA, 1990-2015

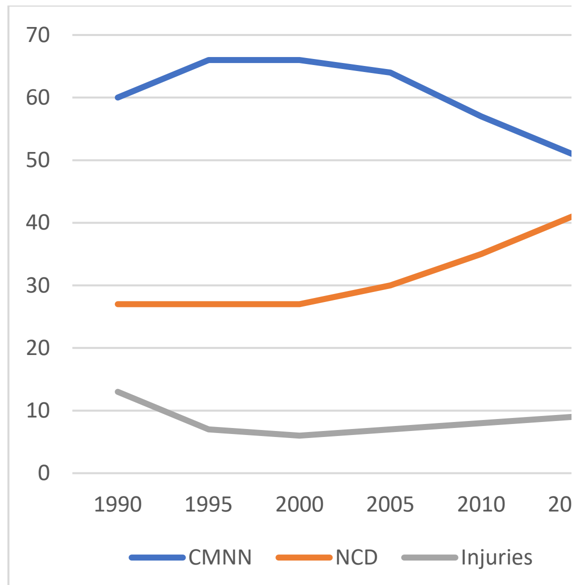


FIGURE 3.4b: PERCENTAGE CONTRIBUTION OF TOTAL AGE STANDARDISED YLL RATES PER 100 000 BY YEARS FOR MAJOR CAUSES FOR BOTH SEXES AND ALL AGE GROUPS IN ETHIOPIA, 1990-2015

Source: Misganaw et al 2017

The trends from the reviewed studies seem to indicate that Ethiopia is experiencing a transition from predominantly infectious diseases to non-communicable diseases. Among others, changes in dietary consumption patterns and lifestyles are likely to play their role in the transition process. However, the importance of infectious diseases, such as lower respiratory infections, diarrheal diseases, HIV/AIDS, tuberculosis, and malaria is still conspicuous that deem the necessity to describe double burden of disease model that depict the epidemiological situation of the country. To make things even worse, the emergence of COVID-19, a highly contagious and virulent virus, towards the end of 2019, further reinforced the validity of the double burden of diseases (DBD) model.

3.4 FEATURES OF URBANISATION IN ETHIOPIA

As is the case in most parts of Sub-Saharan Africa, the rapid pace of urbanisation is one of the key features characterising the changes taking place in Ethiopia. Urbanisation is a key factor associated with changes in food systems and lifestyles that favour the nutrition transition (Popkin 2008). Although one of the least urbanised countries, the fast rate of urbanisation in Ethiopia may have its own impact on the food system. The data from the World Development Indicators compiled by the World Bank indicate that within the 16-year period between 2000 and 2016, the urban population of Ethiopia doubled, from 9.7 million (14.7%) to 20.6 million (19.4%). The proportion of the urban population in Ethiopia is by far below the Sub-Saharan Africa and East African average. During the same period, the percentage of the urban population in Sub-Saharan Africa has increased from 31.4% to 38.8%, which is almost two-fold compared to Ethiopia. In East Africa, the urban population that constituted around 21% in 2000 grew to 26.6% within 16 years.

Urban Ethiopia has a far lower rate of natural growth (fertility less mortality), but the overall growth rate is significantly higher than in rural Ethiopia because of the excessive rural-urban migration, the boundary expansion of urban areas, and the upgrading of rural areas into towns. The prognosis by CSA (2013) indicate that urbanisation is set to grow at 3.8% a year. The estimation by the World Bank and Cities Alliance (2015) predicted a growth rate at an even faster pace, at 5.4% a year. However, because urbanisation started from a low base, it takes a long time before the proportion of the urban population outweighs the rural population. According to the World Bank projection, the proportion of the urban population in Ethiopia is projected to increase to represent 39.3% of the total population in 2037 (World Bank & Cities Alliance 2015).

Schmidt, Dorosh, Jemal, Mekamu and Smart (2020) applied an agglomeration index to define “urban” areas based on their location within one hour’s travel time to cities of 50,000 people and a population density of 150 people per square kilometre and found that urban growth is occurring at a faster rate than the official estimation since the early 2010s. As presented in Table 3.1, in 2015, Ethiopia had 22.5% of the population living in urban areas according to the agglomeration index, far higher than the official estimation. The researchers attributed this to considerable investments in the road infrastructure and the proliferation of secondary cities across Ethiopia. According to the NBE (2018), the length of asphalt roads in Ethiopia has increased from 3,900 km in 2000 to 2001 to 15,900 kilometres in 2016–2017, with a more than a four-fold expansion over a period of 16 years.

The expansion of roads at this pace has important implications for the urbanisation process as it is likely to give rise to smaller towns and increase transport access to towns and cities. The analysis based on the 1994 and 2007 censuses and the 2015 projection, indicated that the percentage age share of the total population within one hour’s travel time to the nearest city of at least 50,000 has increased from 8.7% to 24.5% between 1994 and 2015. In 2015, 58.6% of the total population of the country is within a three-hour’s travel time limit from the nearest city of at least 50,000 (Schmidt, Dorosh, Jemal & Smart 2018).

TABLE 3.1: PERCENTAGE SHARE OF TOTAL POPULATION BY TRAVEL TIME TO THE NEAREST CITY OF AT LEAST 50,000 AND THE PERCENTAGE SHARE OF THE URBAN POPULATION BY THE AGGLOMERATION INDEX: 1994, 2007, AND 2015

Travel time to the nearest city of at least 50,000	1994	2007	2015
Less than 1 hour	8.7	16.2	24.5
1 to 3 Hours	14	28.3	34.1
3 to 5 hours	16.1	20.8	19.8
5 to 10 hours	31.9	23.9	16.2
More than 10 hours	29.3	10.8	5.4
Total	100	100	100
Urban share of total population (Agglomeration Index)	8	15.1	22.5

Source: Schmidt et al (2018)

The substantial investment in the road and electricity infrastructure in Ethiopia since 2000 is likely to increase the penetration of processed foods at relatively cheaper prices in rural, small, and medium towns.

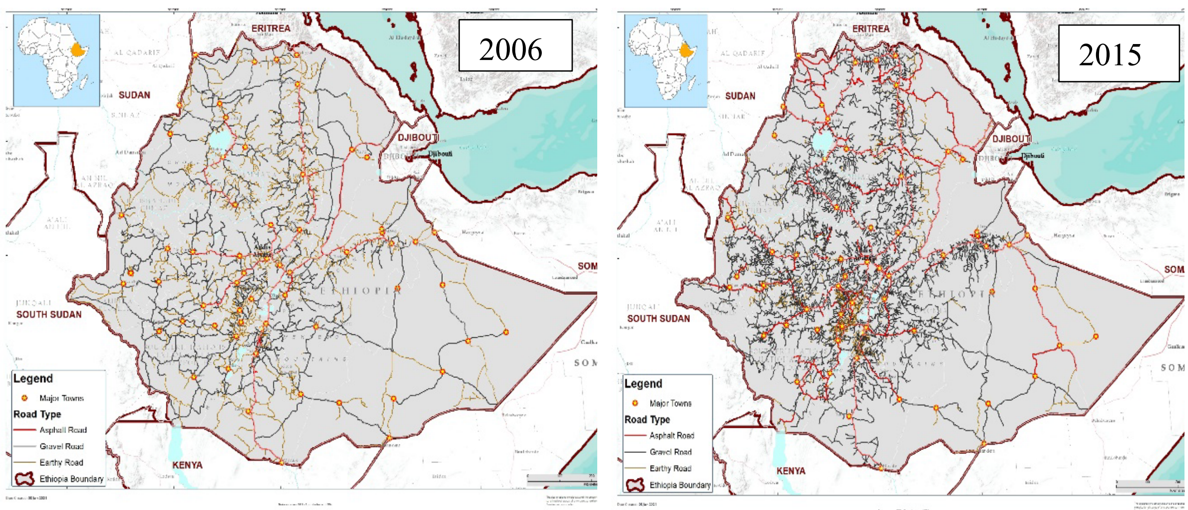


FIGURE 3.5: ROAD (ASPHALT, GRAVEL, AND EARTHY) NETWORK CHANGE BETWEEN 2006 AND 2015 IN ETHIOPIA

Source: Constructed by the author based on the data from Ethiopian Roads Authority

The projection by CSA (2013) indicates that Addis Ababa, the home of 3.3 million inhabitants in 2015, represents the largest city comprising nearly one-fifth of the total urban population in 2015. Addis Ababa is a metropolitan area with a population size exceeding the total population in the next top 16 cities/towns. However, the share of Addis Ababa out of the total urban population in Ethiopia is decreasing due to the faster rate of growth of other towns recently. The second to fifth most populous cities, each having a population size exceeding 300,000 in 2015, are: Nazreth, Gondar, Mekelle, and Hawassa. According to the 1994 *Population and Housing Census*, there were only thirteen cities with populations of 50,000 and over (CSA 1997). In the inter-census period between 1994 and 2007, the number increased two-fold and reached 26. The CSA (2013) projection reveals that cities with more than 50,000 inhabitants increased to 44 in 2015.

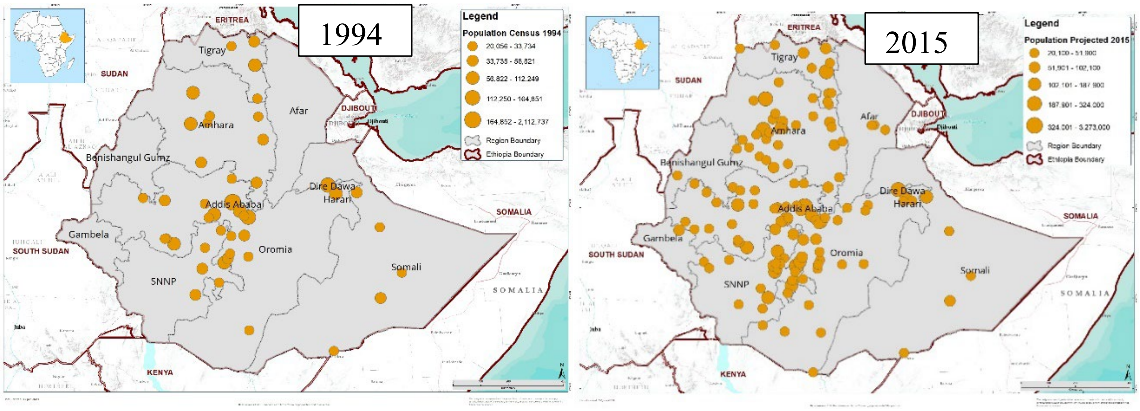
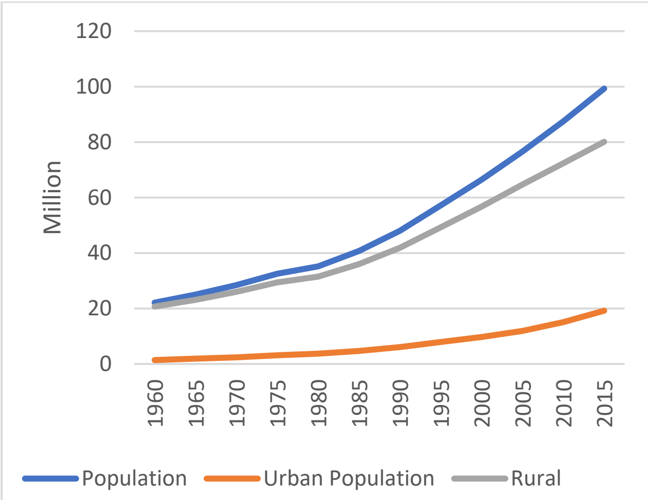


FIGURE 3.6: TOWNS/CITIES WITH 20,000 AND ABOVE INHABITANTS IN 1994 AND 2015

Source: Constructed by the author based on 1994 Population and Housing Census (CSA, 1997) and Population projection CSA (2013)

The study based on longitudinal household surveys and satellite-based night-light intensity, consistently suggests that urban Ethiopia has greater welfare as measured by the real consumption spending compared to rural Ethiopia (Abay, Kibrom, Tiberti, Luca, Mezgebo & Endale 2020). The proportion of poor people in urban Ethiopia has declined from 14.4% in 2011 to 12.1%, despite the proportion of the urban population having increased from 16.6% to 19.5% during the same period (World Bank 2020). This suggests that poverty reduction in urban Ethiopia is taking place at an accelerated pace in comparison with that in rural Ethiopia.

In 2011, despite constituting only 15% of the workforce, the economic activities in cities were contributing 38% of the GDP, which clearly indicates a higher level of productivity of urban economic sectors (World Bank 2015). The greater welfare in urban Ethiopia may attract rural people to migrate to urban centres in search of more remunerative non-farm employment. The rapid urbanisation trends and income growth may play a key role in changing the food system in urban areas by increasing the food demand and changing food preferences (Bruin & Dengerink 2020). On average, urban consumers in Ethiopia are particularly noted to have a higher level of consumption of fruit, vegetables, meat, oils and fats, and sugar in comparison with their rural counterparts (WFP 2019; Gebru, Remans, Brouwer, Baye, Melesse, Covic & Vandenberg 2018).



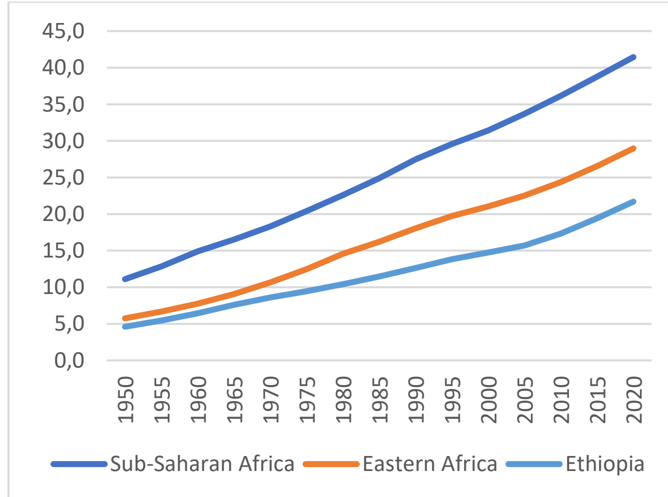


FIGURE 3.7a: TRENDS IN POPULATION SIZE IN ETHIOPIA

FIGURE 3.7b: PERCENTAGE OF POPULATION RESIDING IN URBAN AREAS, 1950-2020

Source: Constructed based on World Development indicators

3.5 ECONOMIC TRANSITION IN ETHIOPIA

The GoE has designed and implemented four poverty reduction strategy plans (PRSPs) between 2002 and 2019/20. The first plan was named the *Sustainable Development and Poverty Reduction Programme* (SDPRP), covering the period 2002/03 to 2004/05. For the period between 2005/06 and 2009/10, a second five-year plan called a *Plan for Accelerated and Sustained Development to End Poverty* (PASDEP) was prepared and implemented. The aim of PASDEP was to ensure accelerated, sustained, and broad-based development as well as lay the groundwork for Ethiopia's MDG objectives to be met by 2015 (MOFED 2006). SDPRP and PASDEP emphasised the agriculture-led industrialised development (ALDI) strategy to achieve the poverty reduction and development objectives. Based on the lessons learned from the design and implementation of the SDPRP and PASDEP, the GOE prepared the five-year *Growth and Transformation Plan* (GTP I) that aimed to achieve even higher economic growth and other development targets for the period spanning between 2010/11 and 2014/15. Although GTP I maintain the importance of the modern and productive agriculture sector that uses enhanced technology, it seeks the industrial sector to play a leading role in the economy (MOFED 2010). GTP, I set out to implement a number of grand projects that are envisaged to transform the economy, such as The Grand Renaissance Dam Project, railway projects, and the sugar development projects. The expansion of industrial parks is set to accelerate the industrialisation process and boost the labour opportunities in the manufacturing sector. After reviewing the performance of GTP I, the National Planning Commission prepared the fourth PRSP named GTP II for the period 2015/16 to 2019/20. GTP II set out to sustain accelerated economic growth and establish a springboard for economic structural transformation (NPC 2018). The GTP II aims to lay the ground to the transition of the country to the lower-middle income status by 2025 (NPC 2018), which is defined by the World Bank as having a GNI per capita of between 1,086USD and 4,255USD (World Bank 2022).

During the implementation of the four PRSPs, Ethiopia has experienced rapid economic growth and poverty reduction that may have a profound effect on changes in the food system and the nutrition transition. According to the World Development Indicators (WDI) database published by the World Bank, Ethiopia registered an annual average GDP growth rate of 10.8% between 2000 and 2016, far higher than the average for sub-Saharan Africa, which recorded a 4.7% average annual growth during the same period. The growth rate is considered as one of the fastest in the world. The rapid GDP growth started from a meagre 8.3 billion USD in 2000 and climbed to 74.3 billion in 2016, a more than nine-fold increase over a period of 16 years.

The WDI data further attests that Ethiopia is the 62nd biggest economy as measured by nominal GDP in the world and third biggest in sub-Saharan Africa next to Nigeria and South Africa in 2019. The GDP per capita has also increased by six-fold between 2000 and 2016, from 120 USD increased to 717 USD. When adjusted for purchasing power parity (PPP), that indicates the sum value of all goods and services produced.
in the country valued at prices prevailing in the United States, the GDP per capita in Ethiopia rose from 483 USD in 2000 to 1879 USD in 2016. The GDP per capita

adjusted to PPP registered in Ethiopia in 2016, is equivalent to 51% of the average for Sub-Saharan Africa, which stood at 3690 USD in the same year. The economic growth is principally driven by sustained growth in agriculture and service sectors and heavy public investment in the infrastructure including road networks, hydroelectric power plants, telecommunication systems, health and education facilities, airports, and railways (World Bank, 2009; Shiferaw 2017).

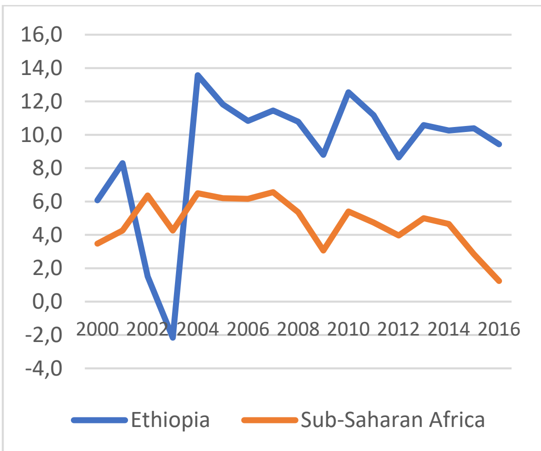


FIGURE 3.8a: TRENDS IN ANNUAL GDP GROWTH RATE, ETHIOPIA AND SSA

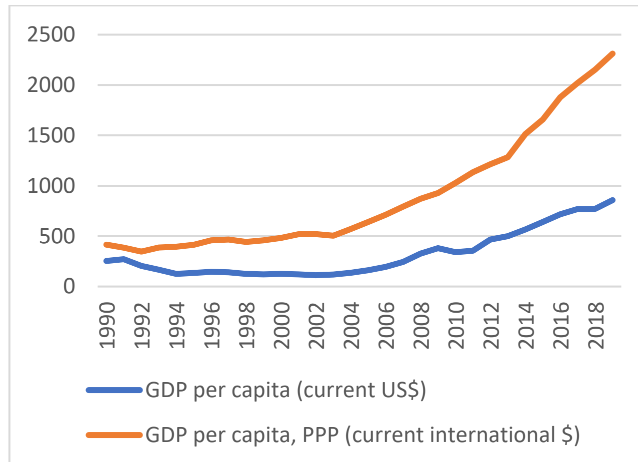


FIGURE 3.8b: TRENDS IN GDP PER CAPITA (NOMINAL AND ADJUSTED TO PPP), ETHIOPIA

Source: World Development Indicators (2019)

The data published by National Bank of Ethiopia (NBE) suggest that the share of agriculture to the GDP fell from 59.3% in 1999/2000 to 36.7% in 2016/17. The share of service sector, after increasing progressively from 37% in 1999/2000 to 47.3 in 20015/16 and decreased to 39.3% in the following fiscal year. The accelerated growth registered in the service sector in the period of a decade and half is associated with the expansion of public and private spending on education and health sectors, financial services, transportation, and domestic trade (Shiferaw 2017). The share of the industry sector, after a steady but slow increase between 1999/2000 and 2015/16, spiked from 16 % to 25.6 % within a year period. However, the after sluggish increase over the years is difficult to explain as there was no major change on the ground.

Cochrane and Bekele (2018) associate the abrupt spike of the share of the industry sector in 2016/17 with the completion or near completion of industrial parks that are envisaged to catalyse the transformation of the economy. The major contributor for the industry sector output is the construction sector which is spurred by the boom in the roads, railways, dams, and residential houses (Cochrane & Bekele 2018; NBE 2018). The shift in the structure of the economy that gives rise to the increasingly dominant role of the industry sector indicates the transformation of the economy is taking place.

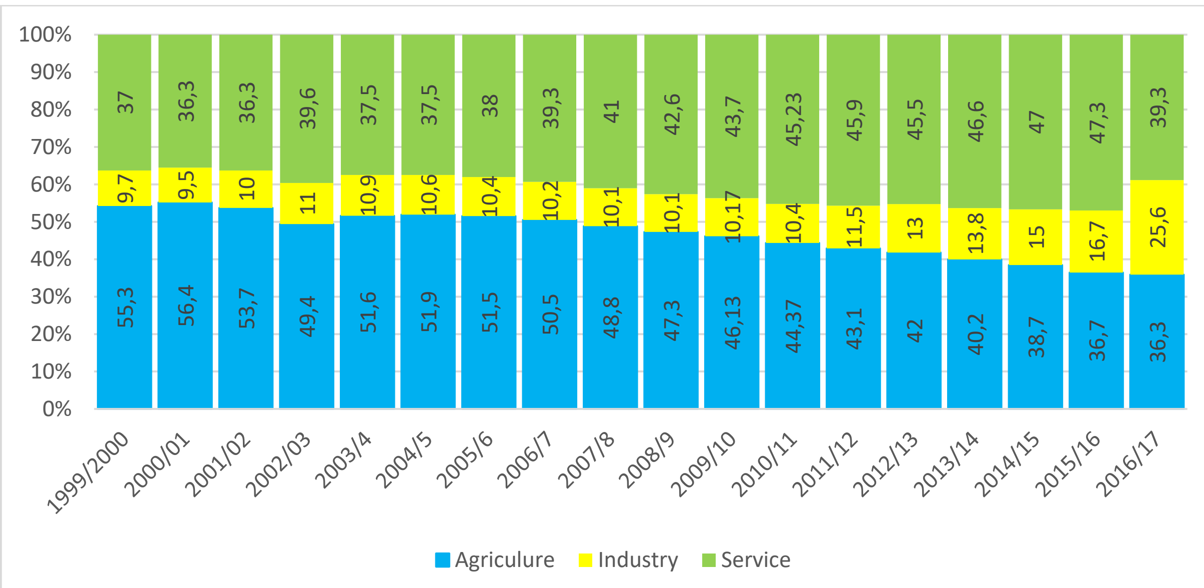


FIGURE 3.9: PERCENTAGE SHARE OF ECONOMY SECTOR TO THE GDP, ETHIOPIA 1999/00 TO 2016/17

Source: NBE (2018)

Agriculture employs 72.7% of the country's workforce, accounts for around 90% of export revenues, and 70% of the country's raw material requirements for industry (Platform for Agricultural Risk Management 2016). While coffee is Ethiopia's greatest foreign exchange earner, agricultural goods such as oilseeds, grains, khat, meat and meat products, live animals, leather, and leather products, cut flowers, and so on are key export commodities (NBE 2017). Ethiopia has one of the greatest cattle populations in Africa. In 2015/16, the country had around 57.8 million cattle, 29.7 million goats, 28.9 million sheep, and 60.5 million poultry (CSA 2017). However, livestock output and productivity in Ethiopia are low due to inadequate breeding and husbandry practices. According to Shapiro, Gebru, Desta, Negassa, Nigussie, Aboset and Mechale (2017), the total annual livestock production in 2013 was 1,128 metric tonnes (MT) of meat, 174 million eggs, and 5.2 billion litres of milk.

Over the last two decades, investment in the industry sector has primarily been in infrastructure, construction, agriculture/horticulture, agricultural processing, textiles, leather, and leather products. In 2016, the manufacturing sector contributed less than 8% of total exports, but the government expects this to increase in the coming years due to the growing presence of international investors. The GTP II (2015/16-2019/20) aims to develop the manufacturing of textiles and garments, leather goods, and processed agricultural products (NPC 2016). The focus on these sectors is driven by the country's relative advantage compared to other sectors. To support the industrialisation process, Ethiopia is working to increase installed power generation capacity by building major dams, including the Grand Renaissance Dam with a planned power generation capacity of 6000 MW, and expanding to other sources of renewable energy. The movement of a large labour force to these construction camps is likely to have significant implications on the dietary habits. The increased participation of females in the labour force, who traditionally play a role in household food preparation, shifts people's reliance away from traditional time-intensive food preparations towards precooked, ready-to-eat convenience foods at home or fast food and snacks away from home.

The poverty analysis in Ethiopia is primarily based on the multiple rounds of HCES since 1995. The years between 2000 and 2016 saw a rapid poverty reduction in Ethiopia suggesting that the economic growth has translated into a strong consumption growth. In 2000, individuals deemed poor according to the international poverty line of 1.90 USD per person per day in PPP accounted for 55.3% (World Bank 2015), while people under the national poverty line constituted 44.2% (WFP 2019). In 2016, the proportion of poverty-stricken people in Ethiopia declined to 27% and 23.5% according to the international poverty line and national poverty line, respectively. This means individuals that have the minimum amount of money required to afford the food that provides the minimum required caloric intake and additional non-food items have decreased by 47% over 16 years. At the same time, the food poverty rate declined from 41.9% to 24.8% during the same time, indicating that the proportion of Ethiopians that lacked the money required to buy the daily recommended calories decreased by 40.8%.

The poverty reduction in urban Ethiopia has accelerated in contrast with rural Ethiopia. Between 2000 and 2016, in urban Ethiopia, the absolute poverty headcount dropped from 36.9% to 14.8%, while food poverty fell from 35.3% to 15.2%. The considerable improvements registered in food and non-food consumption expenditure (and thus, income) in Ethiopia in general and in urban Ethiopia, in particular, have significant implications for the likely dietary change from the traditional starchy staples to higher value diets including animal source foods, fruit and vegetables and processed foods, for example.

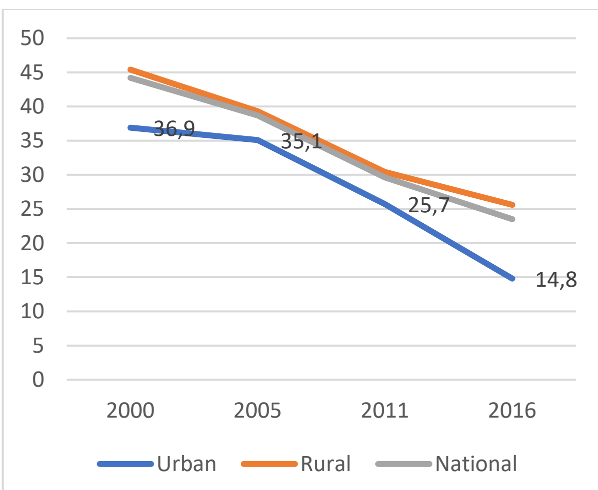


FIGURE 3.10a: TRENDS IN HEAD COUNT POVERTY (2000-2016)
Source: Constructed based on WFP 2019

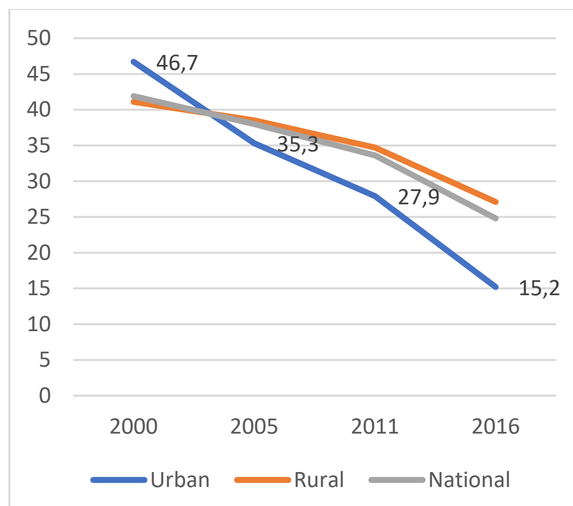


FIGURE 3.10b: TRENDS IN FOOD POVERTY (2000-2016)

3.5 INFLATION AND FOOD PRICES IN ETHIOPIA

3.5.1 Inflation in Ethiopia (2000-2017)

Inflation which measures the cost of living is an important determinant of households' expenditure on goods and services including food. CSA uses the weighted average change in the price of a basket of goods and services to determine CPI. Since the first basket was established in 2000, it was repeatedly rebased in 2006, 2011, and 2016 in accordance with the changes in consumption patterns according to the HCE surveys. Figure 3.9 displays the trend of year-on-year headline, food, and non-food inflation in Ethiopia between 2000 to 2017 (December 2011 Consumer Price Index (CPI) =100). The index for headline inflation constitutes 53% of food and 47% of non-food expenditure, which is set based on the expenditure pattern of the 2011 HCES. The major drivers of the food index are cereals, which constitute around 18% of the overall CPI or around 34% of the food index, followed by vegetables that comprise 13% of the CPI.

After the market experienced deflation in food prices in 2002 due to the bumper harvest, the headline inflation spiked sharply and reached 17.5% in May 2003, primarily driven by the strong increase in the food index that reached a historic 31%. The food price hike in 2003 was attributable to the significant decline in food production in the year due to the severe drought. The years between 2005 to 2007 saw double-digit inflation due to the rise in both food and non-food indices. This is perplexing given that agricultural food production in these years was increasing at an accelerated pace. During the three years, the average inflation registered in the country was around 13% although these years registered a substantial increase in food production. The headline inflation rate accelerated to a record elevated level of 62% in 2008. The spike was induced by the unprecedented rise in food inflation which surged to 92% in the middle of the year. Given that the urban population is almost entirely dependent on market to access food and a significant share of household expenditure is allocated for food, such an increase in food price is likely to lead to deterioration of welfare. Alem and Söderbom (2012) indicate that households were forced to adjust their food consumption in response to the unprecedented high food price inflation during this period.

The period of galloping inflation the country experienced coincided with the global food crisis that was caused by dramatic increases in the prices of major staples such as wheat, maize, and rice. However, the link or the price transmission mechanism between the two episodes is not clear given that commercial import constitutes a negligible proportion of the food consumption in Ethiopia. The drivers of the food inflation as explained by different researchers were the rise in domestic demand, expansionist monetary policy, investment in infrastructure, and the shift from in-kind food assistance to cash-based transfer (Ahmed 2007; World Bank, 2007; IMF 2008; Loening, Durevall & Birru 2008).

A range of policy measures have been taken by the government to arrest the inflationary pressure and mitigate its impact on the macroeconomy and the wellbeing of poor households. These measures among others, include import and distribution of wheat to urban dwellers at subsidised prices, ban export and local procurement of cereals by World Food Programme (WFP) and other humanitarian agencies, restrict the supply of monetary aggregates in the economy and remove value added and turnover taxes that were imposed on food grains and flours (Admassie 2015). These policy measures seem to have brought about the intended objectives in the following years. The food index fell abruptly and reached another deflation between mid-2009 and mid-2010 while the non-food index remained relatively stable throughout.

Starting from the end of 2010, the food index and hence the headline inflation started to rise quickly once again and mounted to new height in October 2011 at 52%. The monthly year-on-year inflation registered in 2011 and 2012 averaged around 29.5% while the food index rose by 34.2% during the same period. Despite the inflation that occurred in the year, which is likely to put pressure on the wellbeing of net food buyers particularly in urban Ethiopia, the analysis from HCES conducted in 2011 suggests substantial and consistent improvement in terms of consumption possibly due to an increased income. In 2013 and 2014, underpinned by an increase in agricultural production and general economic growth, the headline inflation remained relatively stable within the government target of below 10% (single digit) and the food inflation ran below the non-food inflation. In 2015, once again the food inflation surpassed the non-food inflation, and the headline inflation climbed to double digits, averaging at 10.1%. Despite the fact that 2016 was a year characterised by drought that affected food production negatively, the inflation rate in 2016 and the first half of 2017 remained in single digits.

As illustrated in Figure 3.11, the food index is more volatile in contrast with the non-food index. Although overall consumption continues to improve, the consumption among the poorest segment of the population did not show real consumption growth between 2005 and 2016 (World Bank 2020). The volatility in food prices is likely to affect the poorest urban households that are net buyers of food disproportionately. This may force them to shift their dietary pattern to one dominated by cheap, inferior quality, non-basic foods available at increasingly proliferating convenience shops and street food vendors.

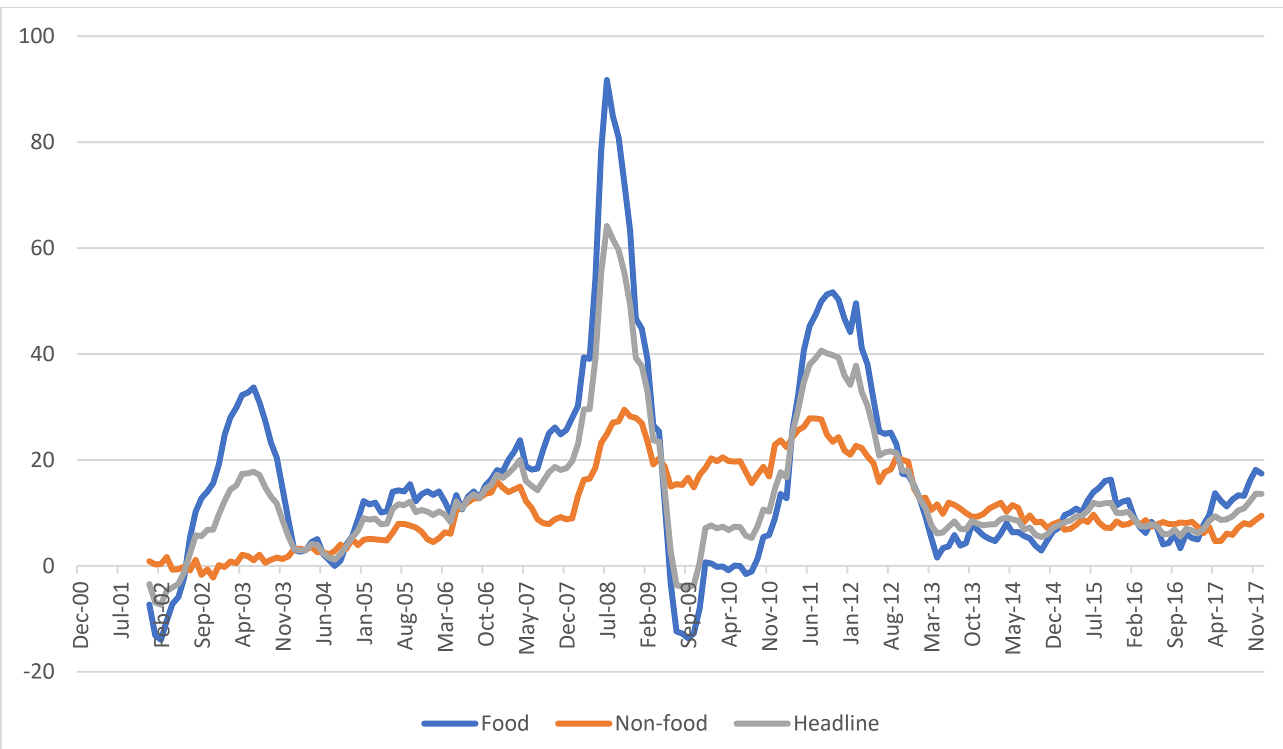


FIGURE 3.11: TRENDS IN HEADLINE, FOOD, AND NON-FOOD INFLATION, ETHIOPIA

Source: Compiled from Central Statistical Agency (CSA) CPI reports

The change in CPI between 2000 and 2017 (December 2011 CPI=100) suggests substantial differences among different food categories. The cereals and bread category comprise a basket of commonly consumed staple cereals (maize, teff, wheat, sorghum, and rice), bread and bakery products (injera, bread, for example), and pasta. The weight of cereals represents the largest share of the national CPI. The CPI of bread and cereal category, which was around 20.7 in December 2000, rose to 141 in December 2016, suggesting that the weighted average price of the basket of cereals had increased by 581% over the stated period. The prices of bread and cereals depicted a recurrent fluctuation within a year, indicating seasonal differences. Cereal prices tended to increase during the lean season (June to September) and downwards during the *Meher* harvest season (October to January) following the production cycle.

The index for the oil and fats category, which includes butter and edible oils, rose from 22.7 in December 2000 to 151 in December 2016. However, blending various sources of oils and fats into one basket might have masked the difference in the price trend of the components of the basket, which should be interpreted cautiously. The CPI for meat jumped by a strong 1023% from 17.6 to 197.7 within the 17 years period under consideration.

The indices for fruit and vegetables tended to move in tandem and increased by 762% and 740%, respectively, during the same period. The weight allocated for fruit was just 0.26% of the national CPI suggesting the exceptionally low level of the household budget allocated to fruit in Ethiopia. On the other hand, vegetables constituted 13% of the national CPI weight, implying that households tended to spend a substantial portion of their household budget on vegetables.

The index for sugar, jam, and honey, rose by 318% only, the smallest increase of all the CPI food groups. The relatively smaller increase in the nominal prices of sugar, jam, honey, and chocolate compared to the other food categories may create a favourable environment for a nutrition transition. This may serve as a general background on how the nominal prices of food categories have progressed during the study period.

3.5.2 Trends of food prices in Addis Ababa (2003-2017)

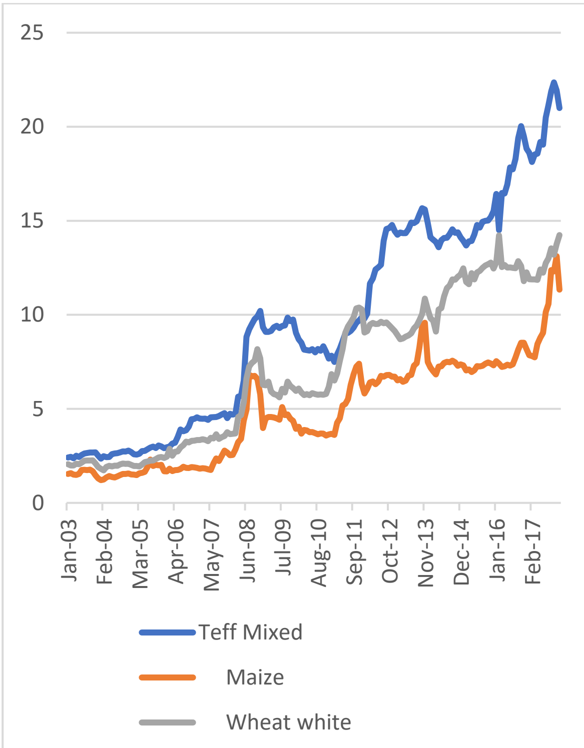
As indicated in the previous chapter, food prices and food affordability are important determinants of the types of food consumed by households (Turrell, Hewitt, Patterson, Oldenburg & Gould 2002). The evidence suggests that urban Ethiopia's income and consumption expenditure has increased over the past two decades (World Bank 2020). The change in Consumer Price Index (CPI) shows the price level of a weighted average of a basket of food which may conceal the changes in specific items relevant to explain the nutrition transition. Amidst high inflation, the change in nominal prices does not show the actual price change over time as it is confounded by the inflation comparison of the evolution of different food items is faulty.

In this section, the historical monthly nominal prices of important food items that are relevant to explain the nutrition transition in Ethiopia have been deflated by the national CPI (December 2011=100). This will allow a comparison of real prices over time by expressing them in December 2011 Birr terms. Given that Addis Ababa is the largest city and a centre of consumption and transhipment to other markets in the country, it is considered a price setter for food prices nationally. Therefore, analysing the actual price trends of the Addis Ababa market is critical as it signals the overall market situation of the food market in the country. Figures 3.13a to 3.13f illustrate the patterns of change in the nominal and real prices of different food items in the Addis Ababa markets between January 2003 and December 2017.

Throughout this period, the nominal prices of all food items have increased multiple fold. For example, the nominal prices of *teff,* lentil, beef, and egg increased by more than 7 – fold, 11-fold, 9-fold, and 9-fold, respectively. The real prices of cereals reached its peak in 2008. The average annual actual price of *teff* increased by 21% between 2003 and 2016 while the price of maize showed 16% decrease over the same period. Underpinned by the Government wheat subsidy programme, the actual price of wheat showed generally decreasing trend since 2011. Similarly, between 2003 and 2016, the average annual real prices of factory-processed wheat products, namely, spaghetti and breads prepared and sold at bakeries dipped by 44% and 46%, respectively. The actual price of *injera* appreciated by 23%, reflecting the increase in the prices of *teff.* The actual price of lentils, an important ingredient of Ethiopian sauce, increased by 94% during the same period.

Over the 14 year- period, the real prices of beef, milk, and eggs surged by 61%, 30%, and 50%, respectively, suggesting that the real prices of animal source foods are getting expensive even after removing the effect of inflation in the market. The real prices of edible oil exhibited strong reduction while the real prices of butter trended upwards during the period under discussion. Between 2003 and 2016, the real prices of imported edible oil, which largely constitutes palm oil that is consumed by the large majority of the population, plummeted by 71%. The actual price of locally produced edible oil extracted from linseed, sesame, Niger seed exhibited a 16% reduction during the same period. The nominal and real prices of fruits and vegetables are characterised by volatility that is associated with seasonality and perishable nature of the items. While the average annual real prices of carrots, tomatoes and bananas showed an increase of 47%, 37%, and 8%, respectively, the real prices of onions dipped by 20% between 2003 and 2016.

The real prices of sugar and beer dropped by 35% and 19%, respectively, which signals a possible conducive price environment for the taking place of nutrition transition. On the other hand, the real prices of homemade local beer (*tela)* increased which may be owing to the price increase of the ingredients needed to prepare it. This may give way to replacing the homemade local beer (*tela*) with factory processed beer that is available at relatively cheaper prices and convenient for home arrangements in urban settings. In general, during the period under consideration, the real prices of items that characterise nutrition transition in one way or another such as factory-processed wheat products, edible oils, sugar, and beer moved downwards while the real prices of nutritious foods such as *teff,* animal source foods, fruit and vegetables, lentil elevated.



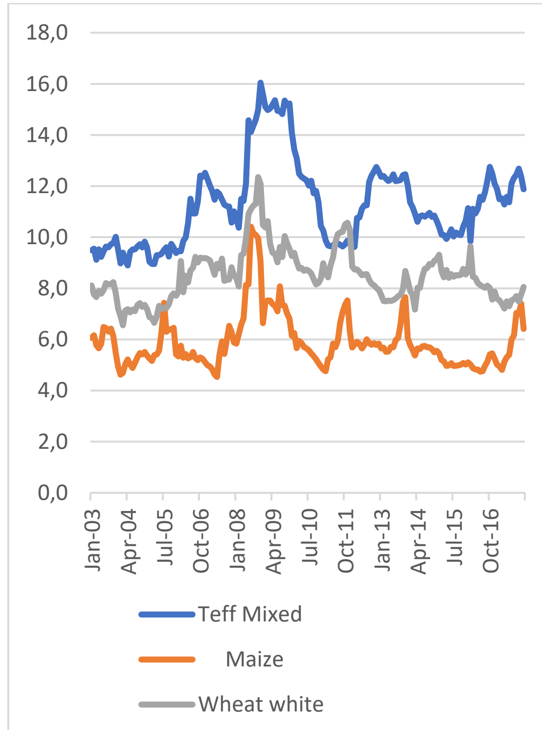
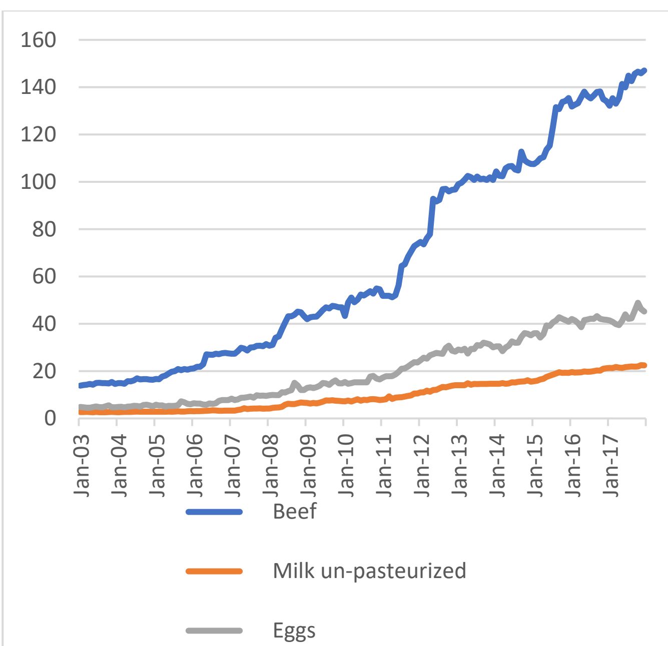


FIGURE 3.12a: TRENDS IN NOMINAL PRICES OF CEREALS (2003-2017), ADDIS ABABA

FIGURE 3.12b: TRENDS IN REAL PRICES OF CEREALS (2003-2017), ADDIS ABABA



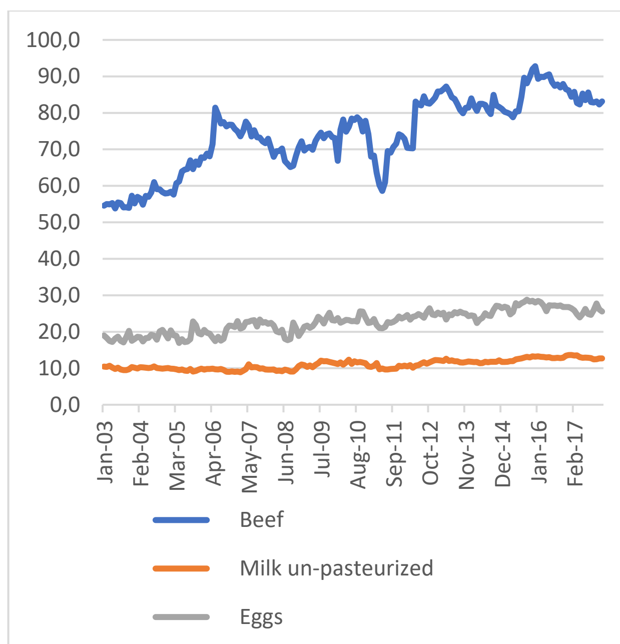


FIGURE 3.12c: TRENDS IN NOMINAL PRICES OF ASFs (2003-2017), ADDIS ABABA

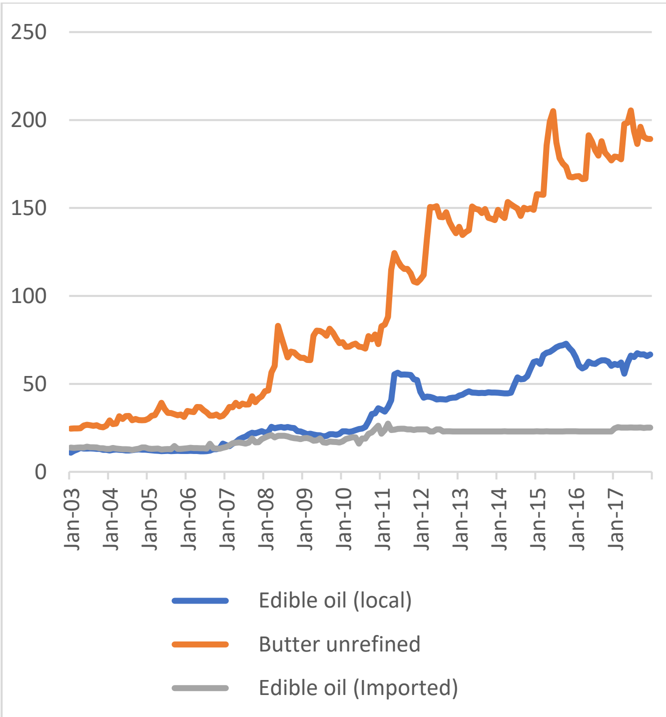


FIGURE 3.12d: TRENDS IN REAL PRICES OF ASFs (2003-2017), ADDIS ABABA

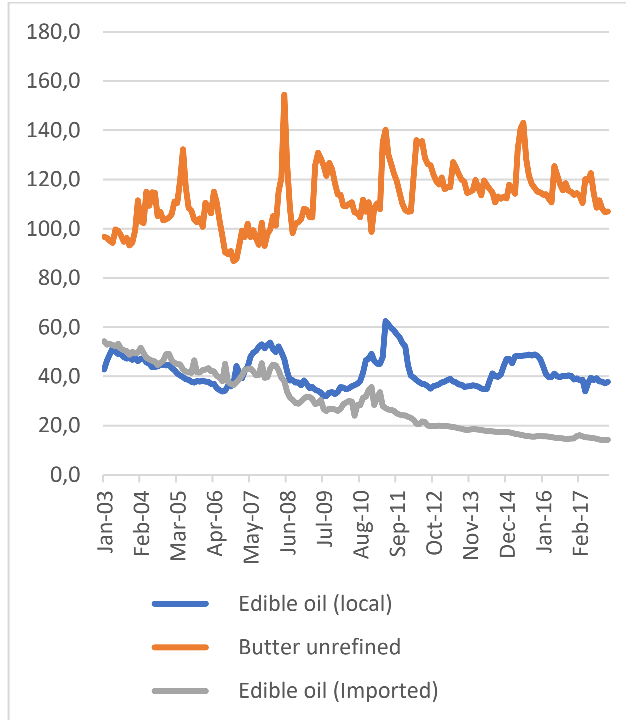


FIGURE 3.12e: TRENDS IN NOMINAL PRICES OF FATS AND OILS (2003-2017), ADDIS ABABA

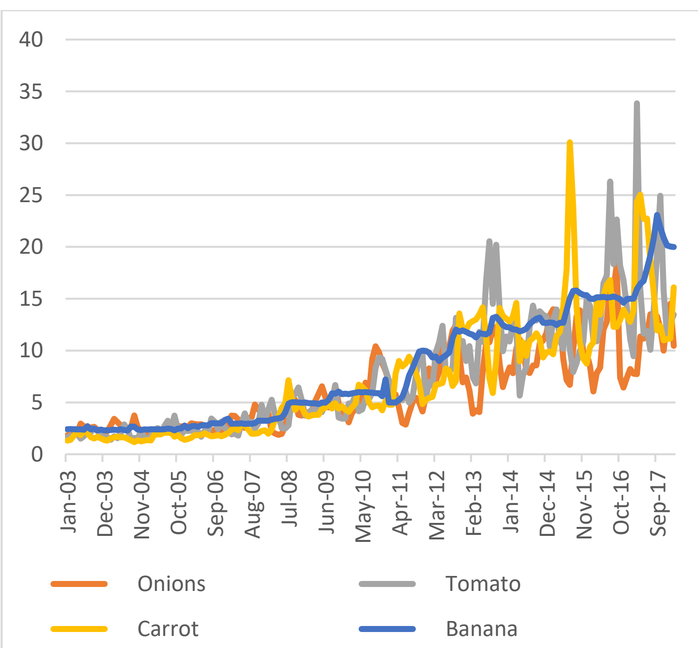


FIGURE 3.12f: TRENDS IN REALL PRICES OF FATS AND OILS (2003-2017), ADDIS ABABA

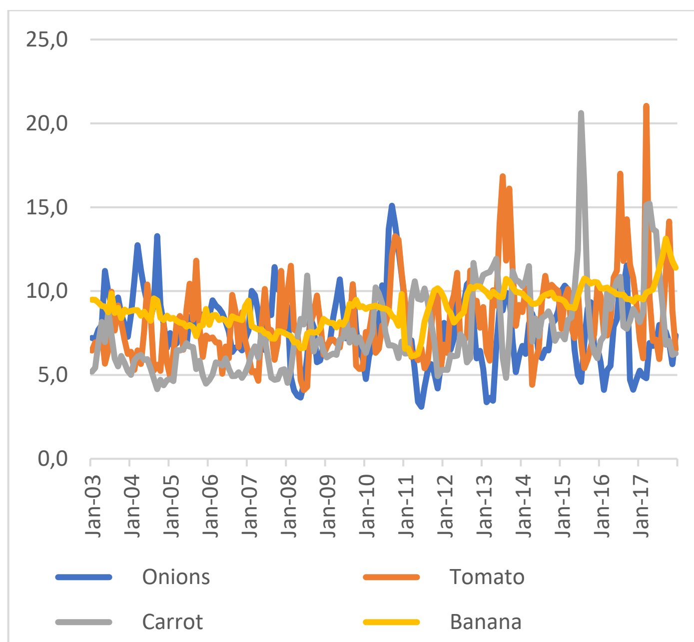


FIGURE 3.12g: TRENDS IN NOMINAL PRICES OF FRUITS AND VEGETABLES (2003-2017), ADDIS ABABA

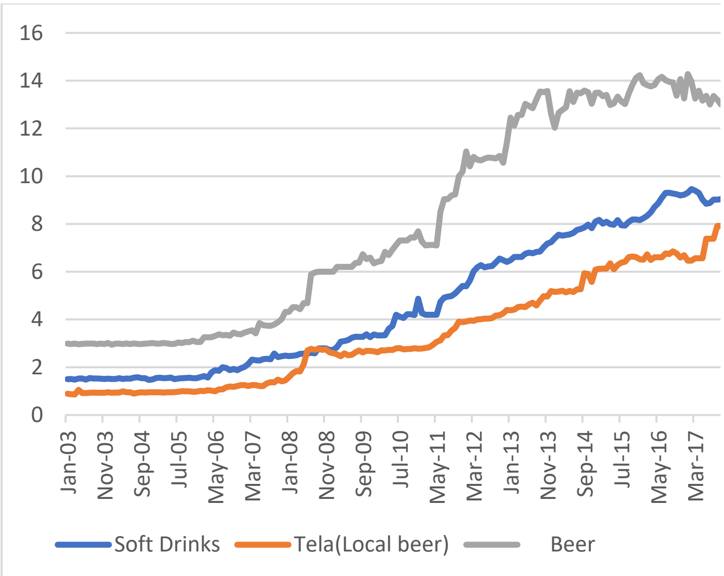


FIGURE 3.12i: TRENDS IN NOMINAL PRICES OF ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES (2003-2017), ADDIS ABABA

FIGURE 3.12h: TRENDS IN REAL PRICES OF FRUITS AND VEGETABLES (2003-2017), ADDIS ABABA

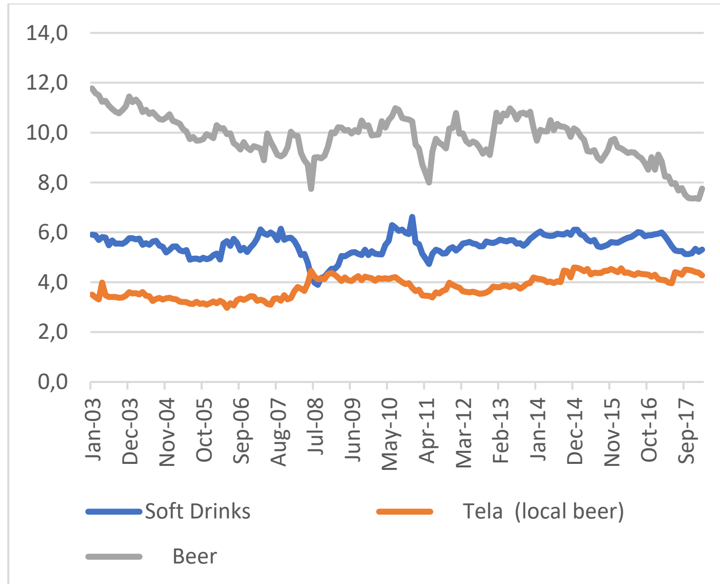


FIGURE 3.12j: TRENDS IN REAL PRICES OF ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES (2003-2017), ADDIS ABABA

Source: Computed from CSA CPI data

TABLE 3.2: ANNUAL AVERAGE NOMINAL AND REAL PRICES OF FOOD COMMODITIES IN ADDIS ABABA MARKETS IN 2003 AND 2016 (DECEMBER 2011 CPI=100)

Item	Unit	2003 (Birr)		2016 (Birr)		Percentage Change (2003-2016)	
		Nominal	Real	Nominal	Real	Nominal	Real
Teff (mixed)	Kg	2.5	9.6	17.7	11.5	595%	21%
Maize	Kg	1.6	6.0	7.7	5.0	384%	-16%
Wheat (white)	Kg	2.1	7.9	12.6	8.3	499%	4%
Rice	Kg	4.5	16.7	16.2	10.6	263%	-37%
Lentils	Kg	3.9	14.7	43.5	28.4	1012%	94%
Spaghetti (local)	Kg	7.5	28.1	23.9	15.6	220%	-44%
Wheat bread (bakery)	350 g	1.4	5.4	4.5	2.9	208%	-46%
Injera (*Teff* mixed)	325 g	0.6	2.2	4.2	2.7	605%	23%
Beef	Kg	14.6	54.9	135.4	88.4	825%	61%
Milk (Cow unpasteurised)	L	2.7	10.0	20.0	13.1	647%	30%
Eggs (chicken)	Dozen	4.8	18.1	41.6	27.1	759%	50%
Edible oil (local)	L	12.8	47.9	61.9	40.4	385%	-16%

Item	Unit	2003 (Birr)		2016 (Birr)		Percentage Change (2003-2016)	
		Nominal	Real	Nominal	Real	Nominal	Real
Butter unrefined	Kg	25.7	96.4	178.0	116.2	593%	21%
Edible oil (Imported)	Kg	13.7	51.5	23.0	15.0	68%	-71%
Onions	Kg	2.3	8.6	10.6	6.9	363%	-20%
Tomatoes	Kg	2.0	7.4	16.6	10.8	743%	47%
Carrots	Kg	1.7	6.5	13.5	8.8	687%	37%
Bananas	Kg	2.4	9.1	15.0	9.8	523%	8%
Sugar	Kg	4.8	17.9	17.8	11.6	274%	-35%
Soft drinks	300 ml	1.5	5.7	8.9	5.8	490%	3%
Tela (local beer)	L	0.9	3.5	6.7	4.4	619%	25%
Beer	330 ml	3.0	11.2	13.8	9.0	364%	-19%

Source: Computed from CSA CPI data

3.6 TEMPORAL TRENDS OF FOOD AVAILABILITY IN ETHIOPIA (1993 TO 2017)

The analysis in this section is based on the data obtained from the food balance sheet (FBS) available in the FAOSTAT database. In some cases, FAO data are supplemented by data from other sources like the Central Statistical Agency (CSA) of the Ethiopia government, or the World Bank. Although FBS data are available starting from 1961, the year 1993 was selected as a baseline because the food availability in Ethiopia started to increase dramatically as of this year after a stagnant situation before the country emerged out of decades long civil war. As has been the case in other African countries, the 1980s was a “lost decade” as the country had been hit by an economic crisis.

The annual FBS provides the trends of national food supply available for human consumption from domestic production, imports, and stock changes after deducting the amount utilised for livestock feed and seed, wasted during storage and transportation, exported out of the country, and industrial non-food use. This helps to gauge the overall adequacy of the food supply in the country in relation to nutritional requirements. However, the data from the FBS indicates the nationally available quantity of food items for human consumption rather than the quantity of food actually consumed at household or individual levels. Thus, the FBS data tend to overestimate consumption as it counts wastage during food preparation, losses due to processing, food that is spoiled or simply not eaten and food fed to animals in the home as consumed (Schmidhuber & Traill 2006). FBS data does not show the differences in the quantities available across geographic areas, socio-economic groups, ecological zones within a country and the seasonal variation of availability within a year (FAO 2001). These limit its use of FBS data for detailed analysis of aspects that characterize nutrition transition unless complemented with household survey results.

FBS also provides calculated data on per capita values for the supply of all food commodities (in kg/capita/year) and the calories (kcal/capita/day), protein supply quantity (g/capita/day), and fat content (g/capita/day). These per capita data are calculated by dividing the food items available for human consumption by the population sharing the resources. Analysis of the trends of these key indicators also helps to assess the possible change in dietary consumption patterns in the country. The analysis in this section is limited to the period between 1993 to 2017. The FBS data for the period 1993 to 2013 was compiled using the old method while the innovative approach was applied to compile the data for the years between 2014 and 2017. In the old method, the FBS components may inherit outstanding unbalanced amounts which are causes for statistical errors. To overcome this shortcoming, the new method has introduced a balancing mechanism that spreads the imbalances proportionally across all components (FAO n.d.).

3.6.1 Trends in daily dietary energy, protein, and fat availability

This sub-section expounds the trends in availability of energy, protein, and fats using FAOSTAT data.

3.6.1.1 Dietary energy (Kcal/per capita/per day)

The calorie requirements of a person vary according to the age, sex, activity level, body-size and composition, physiological state (for example, pregnancy, lactation), coexisting pathological conditions (for example, asymptomatic and symptomatic HIV status) (National Research Council 1989). The average daily calorie requirements are calculated based on the age-sex composition of the population size of Ethiopia for the years 1993 to 2017. The basis for the calculation is the age-sex energy requirements by age and sex for moderate activity levels published by WHO (1985). The annual population size for each age and sex category is obtained from World Development Indicators published by World Bank. Because no data are available on other factors that determine the calorie requirements such as the number of pregnant and lactating women, the number of people infected by diseases such as HIV, it was not possible to take these factors into the calorie requirement calculation.

As indicated in the demographic transition section (section 3.1), the proportion of the youth is expanding while the proportion of the younger age groups is shrinking. As the dietary energy requirement for the youthful age groups is larger, the demographic change implies increased energy requirements from time to time. The calculated average daily calories needed for the entire population of both sexes and all age groups range between 2113 in 1993 to 2171 in 2017. These are slightly above the national recommendation for the country-which is 2100 kcal/per person/per day.

Between 1993 and 2017, the average per capita dietary energy supply in Ethiopia increased from 1507 calories to 2304 calories, an increase of 53%. This means, the average per capita dietary energy supply has been increasing by an average rate of more than 2% a year. The dietary energy supply has been below the amount required kcal/person/day between 1993 to 2013. For example, in 2000, the overall dietary energy supply in the country could barely meets 84% of the number of calories required in the year. After a steady increase over the years under consideration, the supply has been slightly in excess of the requirements in the years 2014 to 2017. In 2016, the average energy supply in Ethiopia is 106% of the calories needed for the population of the country.

The calorie supplies per capita in Ethiopia remained lower than the East African average between 1993 to 2013. The gap between the actual per capita energy supply in Ethiopia and the East African countries average was 19% in 1993 and consistently decreased and reached an overlapping point in 2013. From 2014 onwards, Ethiopia achieved a slightly higher dietary energy supply compared to the East Africa average. For example, in 2016, the average energy supply in Ethiopia was 2.8% higher than the East African average. This is an indication of the progress Ethiopia had made in terms of food supply and closing the gap between demand and supply over the past two decades.

The FBS data further suggests that the general increase in dietary energy supply over the past two and half decades has been accompanied with changes in the composition of foods types available for consumption. Starch staples constituting cereals, root crops and tubers that were providing 82% of the dietary energy supply in 1993, declined to 75% in 2017. With regard to cereals only, their share of the dietary energy supply decreased from 69% in 2000 to 63% in 2016. The share of starch staples in East Africa countries average around 65% in 2016. In US and UK, where the nutrition transition has reached advanced state, starch staples constitute only 24% and 33% of the dietary energy supply, respectively.

The continued dominance of traditional starch staples clearly indicates lack of diversity in the Ethiopian diets. However, because the FBS data are not disaggregated by geographic areas including rural and urban, the data show the overall situation, which conceals the differences that may exist across various parts of the country. The share of fats and oils, which are derived from plants and animals to the dietary energy supply in Ethiopia remained exceptionally low contributing only between 2.9 to 4.4% in the period under consideration. Calories arising from sugar showed an increase from 1.9% in 1994 to 3.7% of the total dietary energy supply in 2017. In the same year, sugar contributed 4.6% of the dietary energy supply in East African countries in general. Although the dietary energy supply has increased substantially, as opposed to the experience of affluent countries, the change is largely stemming from the growth in starchy staples rather than increase in fats and oil, sugar, and animal source foods.

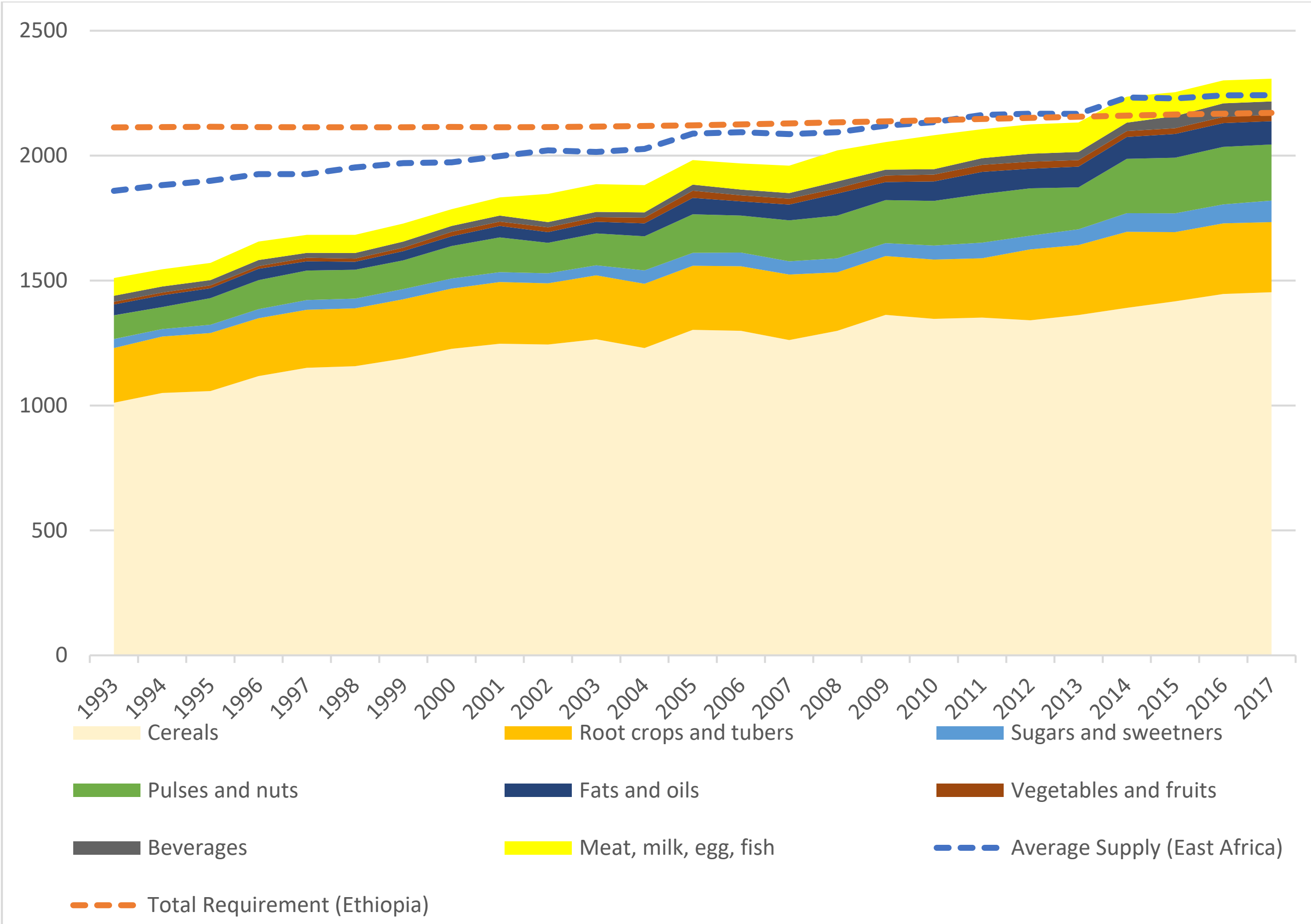


FIGURE 3.13: AVERAGE DAILY CALORIE REQUIREMENT AND TRENDS IN SUPPLY PER PERSON PER DAY FROM DIFFERENT FOOD SOURCES (1993-2017)

Source: Computed from FAOSTAT (2019)

To assess where Ethiopia stands in terms of dietary change compared to the other world, the percentage share of selected food categories to the total dietary energy available is presented in Table 3.1. In 2000, dietary energy available expressed in kilocalories (kcal)/per capita/per day in Ethiopia was only 65% and 73% of the global and African average, respectively. After 16 years of impressive economic growth, the dietary energy supply hiked, which helped Ethiopia to narrow the gap and achieved 84 % of the global average and 88% of the African average. The per capita supply of calories in Ethiopia, which was far lower than that of Kenya in 2000, surpassed Kenya in 2016 which remained almost stagnated. At global level, the share of cereals in the overall dietary energy decreased from 48% to 45%. The share of calories derived from cereals in Ethiopia, albeit declining, is extremely high compared to both the global and African average. In 2016, cereals represented around 45% and 50% of the dietary energy globally and at the Africa level, respectively. South Africa, which has undergone a nutrition transition to advanced stages, and Kenya also have a much lower reliance on cereals for their dietary energy as compared to that of Ethiopia.

TABLE 3.3: PERCENTAGE SHARE OF KCAL/PER CAPITA/PER DAY SUPPLIED BY SELECTED FOOD CATEGORIES IN 2000 AND 2016

Food Category	World		Africa		Ethiopia		Kenya		South Africa	
	2000	2016	2000	2016	2000	2016	2000	2016	2000	2016
Cereals - Excluding Beer	48	45	51	50	69	63	49	53	55	52
Pulses	2	2	4	4	7	9	8	8	1	1
Animal Products	17	18	8	8	4	4	12	12	13	16
Sugar & Sweeteners	8	8	6	6	2	3	10	7	11	11
Vegetable Oils	9	9	8	8	2	4	8	6	10	11
Animal fats	2	2	1	1	1	0	0	1	0	0
Total (Kcal/person/ day	2727	2905	2433	2610	1786	2296	2049	2120	2886	2967

Source: Computed from FAOSTAT (2019)

3.6.1.2 Protein supply (g/capita/day)

The quantity of protein supply per person per day has increased consistently from 42.3 g/capita/day in 1993 to 65.6 g/capita/day in 2017, an increase of 55% over the twenty-five years. During the same period, the average per capita protein supply of East African countries increased from 47.2g/capita/day to 59.1g/capita/day during the same period, suggesting that the per capita protein supply increased at a faster pace in Ethiopia compared to the average for East African countries. However, the major sources of protein in Ethiopia are cereals followed by pulses and nuts, while the contribution of animal protein sources constitutes relatively smaller proportions. Between 1993 and 2017, the protein derived from cereals decreased from 64% to, 60%-this makes cereals the main sources of protein. During the same period, the contribution of pulses and nuts to the average daily per capita protein supply increased from 15% to 23%.

The contribution of animal-source foods, including meat, poultry, fish, eggs, and dairy foods, ranges between 9 and 14% of the protein supply in the country, and there has been no consistent pattern over time. The lowest share of animal-source foods for the available protein supply per capita was registered in the years between 2014 to 2017. Generally, the protein derived from plant-based sources, including cereals, pulses, nuts, root crops, oil seeds, vegetables, and fruit, represents between 86 to 91%. The generally low and stagnated share of proteins derived from animal-based sources, which are often considered more of a luxury among the large majority, gave way for the dominance of low-quality plant-based protein sources, which lack sufficient quantities of certain essential amino acids that are not synthesised by human bodies. Considering the changes in the apparent consumption pattern of protein from plant sources and animal sources, it seems that a dietary shift that triggers a nutritional transition is not taking place yet in Ethiopia as a whole. However, the overall data may have masked the differences across rural and urban and geographic areas, given urbanisation is one of the key drivers of nutrition transition.

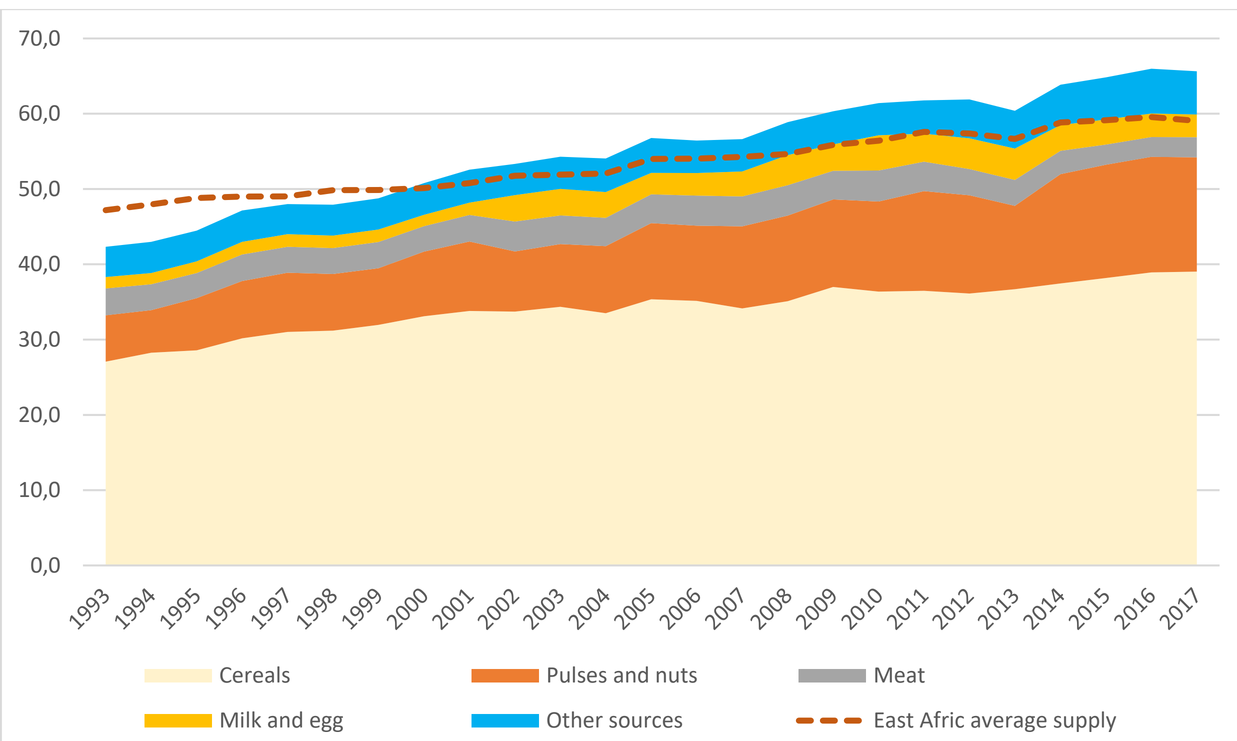


FIGURE 3.14: TRENDS IN PROTEIN SUPPLY (GRAM/PER CAPITA/PER DAY)

Source: Computed from FAOSTAT (2019)

3.6.1.3 Fat supply

Between 1993 and 2017, the fat-to-energy ratio (FER), the share of energy derived from fat out of the total dietary energy (in kcal), ranged between 9 to 12%. This is exceptionally low as compared to the recommendation of FAO that set total fat should constitute between 20 to 35% of the total energy intake for acceptable macronutrient distribution range. The fat supply in Ethiopia is also exceptionally low as compared to the averages for East Africa (14-17%), Africa (18-19%) and the world (23-26%) during the same period.

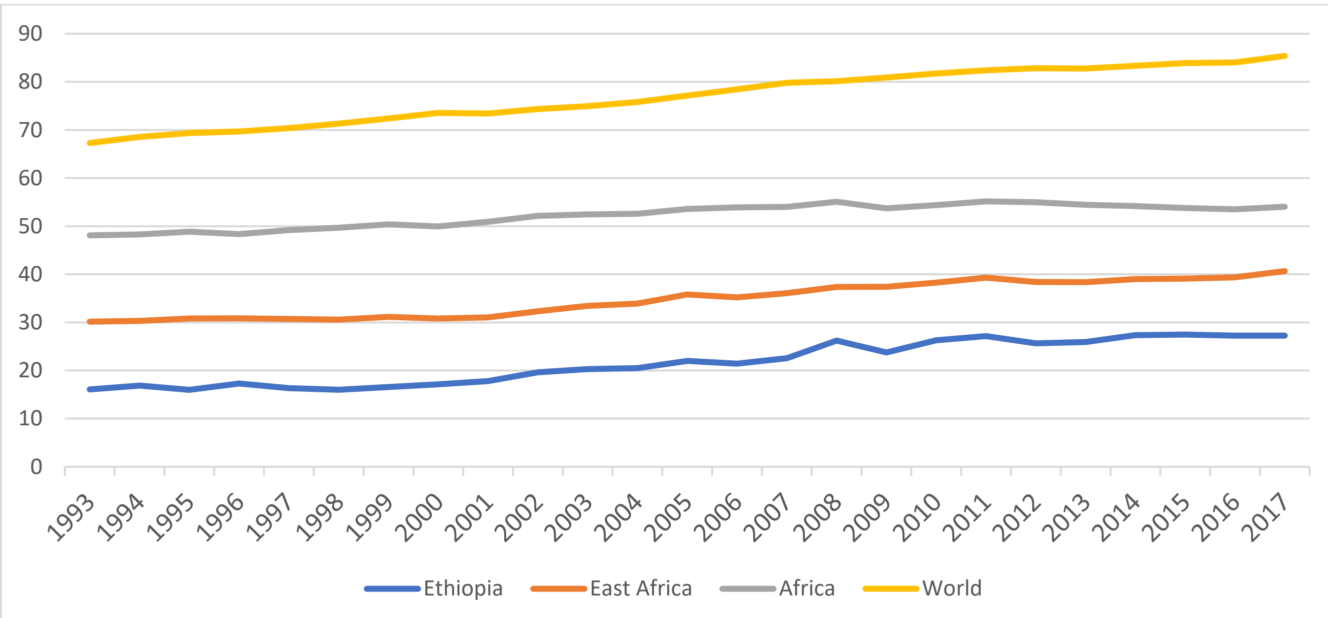


FIGURE 3.15: TRENDS IN FAT SUPPLY (GRAM/PER PERSON/PER DAY)

Source: FAOSTAT (2019)

3.6.2 Trends in the availability of major food groups

3.6.2.1 Starchy staples (cereals and root crops) and pulses

Cereals constitute the most important sources of diet in Ethiopia. The major cereals produced and consumed in Ethiopia are maize, *teff,* wheat, sorghum, and barley, which are largely derived from domestic production. The processing of cereals in Ethiopia involves locally available diesel or electric-run grinding mills, and in some rural areas, manual processing using mortar, pestle, or grinding stones may take place. Households take their cereals to the local grinding mills to get them powdered for which they pay a processing fee in accordance with the weight of the grain (Rashid & Negassa 2011). Wheat, and to some extent maize, are also processed by food processing factories that remove the germ and bran from the grains and produce soft-texture packed flour. Over the past two decades, the increased productivity, particularly in cereal crops, has helped the country provide more food to its people.

The production data from FAOSTAT suggests that the annual cereals production between 2000 and 2016 cereals production has increased by 230% while the population grew by 56.4% during the same period. The notable yield increase in the 16-year period, which made more foods available to consumers, is primarily the result of increased and improved input supplies. According to the 2015/16 Agricultural Sample survey conducted by the CSA, producers consume 67% of their cereal production while only 17% are sold out in the market (CSA 2016).

The per capita cereals available for consumption in Ethiopia climbed steadily from 111 kg/capita/year in 1993 to 158 kg/capita/year in 2017, an increase of 43% over 25 years. Starting from a low base in 1993, the per capita supply of cereals climbed at an accelerated pace to catch up the global and African average which was 176kg/per capita/per year and 163kg/per capita/per year, respectively. Between 2009 to 2013, the per capita cereal supply surpassed the per capita at global level, which may be because of the increasing shift to other dietary sources at global level, while Ethiopia stuck to cereal to satisfy its dietary needs. The world cereal per capita showed an overall downward trend between 2000 and 2013; and the sudden rise observed in 2014 is attributable to the new methodology of calculating the food balance sheets since then.

The steady upward trend in Ethiopia is contrary to the experience of countries that underwent a nutrition transition during the time of income growth, which associated an increase in the per capita income with stagnation followed by a decline of per capita cereal foods consumption. The WDI dataset suggest that the per capita income of Ethiopia has increased exponentially from 124 USD in 2000 to 768 USD in 2017, albeit it is still at an exceptionally low level compared to even Sub-Saharan Africa average that stood at 1490 USD in 2017. No matter how substantial the surge in the per capita income, the dominance of cereals continues in the overall dietary supply of the country.

However, this does not necessarily mean that there are no dietary changes away from the cereals towards processed foods at all, since it may be taking place among some segments of the population (for example, higher income class and urban population) that are possibly masked by the aggregated data at the national level. Tschirley, Reardon, Dolislager and Snyder (2015) point out that middle-income households with 3 USD per capita per day, spend a share of their income on a more diverse diet, including processed foods. It is not clear to what extent the registered economic growth has translated into an increase in the middle-income population of Ethiopia, which is assumed to be a trigger to shifting away from cereal staples to high-value foods. If a larger proportion of the population has not graduated to the middle-income stage, it may not be surprising to note the general upward trends of per capita cereals supply as households should first struggle to meet their calorie needs before shifting to high-value foods.

Maize is the most important cereal in Ethiopia in terms of both production and consumption. Maize is consumed in the form of bread, injera, porridge, and alcoholic and non-alcoholic beverages, after passing through milling, fermentation, baking, germination, roasting, boiling, and pounding. The green maize is an important source of income for producers as it is widely consumed in urban areas. Food processing factories blend maize with soya and fortify with micronutrients to prepare nutritious food known as CSB that is predominantly distributed to malnourished children and mothers through targeted supplementary feeding programmes, funded largely by humanitarian agencies. During the years between 1993 and 2017, the annual per capita maize available for consumption ranged between 36kg to 43kg.

The second most important cereal in terms of the available per capita quantity is wheat, although it has been overtaken by teff in some years. The per capita wheat supply per year after remaining around between 24 and 25kg between 1993 and 1999, spiked to 30kg in 2000 and fluctuated between 31 to 36kg. This is because wheat was not commonly consumed as a staple food until the demand for it picked up around 2000, underpinned by urbanisation and the growing preference for convenience foods, such as packed flour, bread, pasta, biscuits, and other snack foods. About 30% of the wheat consumed in Ethiopia is imported from abroad (USDA 2020).

To fill the gap between the domestic supply and the ever-increasing demand, the government of Ethiopia imports wheat and sells it to flour mills at subsidised prices. The government fixes the prices at which the mills, in turn, sell the wheat flour to selected bakeries that sell it to the consumers. The further mechanism through which imported wheat reaches consumers, is through the humanitarian agencies that distribute food assistance to needy households. The other form of import is in the form of processed wheat products.

The FAOSTAT data is not disaggregated by the type of process undertaken before consumption. It indicates the quantities of wheat and wheat products available by year, but it does not show how much of the wheat is consumed in the form of gain, wheat flour, spaghetti, macaroni, or other pasta products. Wheat and, to some extent maize, in Ethiopia undergo a milling process that removes the bran and germ that contain rich vitamins and minerals, leaving the endosperm that comprises carbohydrates, protein and smaller amounts of vitamins and minerals for consumption. Some cereals are also prepared and consumed in the form of cookies or cake. The lack of disaggregated data conceals the proportion consumed as whole grains and refined cereals. Thus, it is possible to identify whether there is a dietary change that characterises the nutrition transition based on the data provided.

Teff, an important crop, is widely consumed in urban Ethiopia. Because of its extremely high price, poor households mix *teff* flour with cheaper cereals such as maize, sorghum, wheat, rice, and barley to prepare their staple food called *injera*, a spongy pancake-like flat bread. Some 66% of the Ethiopian population are regular *teff* consumers (Berhane, Paulos & Tafere 2011). The FAOSTAT data classified *teff* under "other cereals" as it has too little relevance at the international level to have an individual heading but is still important at the local level. The FAOSTAT list has around five commodities under the "other cereals" category, including *teff*. Since the remaining commodities are not growing and are not consumed in Ethiopia, it is safe to claim that the data under "other cereals" in FAOSTAT database refer exclusively to *teff*.

The per capita availability of *teff*, after remaining flat around 25kg/per person/per year between 1997 to 2005, started to pick up with some fluctuations, but at an accelerated pace since 2013 and reached 33kg/per person/per year. On the other hand, the per capita availability of sorghum, which is the fourth dominant cereal in Ethiopia, after fluctuating for years, started its steady downward trajectory since 2010. A coarse cereal, sorghum, is used to prepare injera, local beer, and other dishes, particularly in the poorer areas. As a close substitute of *teff* to make injera and, in some cases, wheat, it is not surprising to note that its supply declines with a rise in the supply of *teff* and wheat. In 2016, sorghum constituted around 10% of the calorie consumption in Ethiopia (WFP 2019).

Ethiopians produce and consume barley in various forms, mostly in the highland areas where it grows. Barley is processed at home by dehulling, pounding using a mortar and pestle, roasting, cracking, and milling. The most common types of main meals and snacks prepared using barley in Ethiopia include porridge, *injera* (pancake), bread, *kolo* (roasted grain), *beso* (roasted and powdered barley) and *chiko* (roasted barley powder mixed with butter), and *kinche* (cracked grain boiled and mixed with butter or oil). Barley is also used to prepare alcoholic and non-alcoholic beverages in Ethiopia. The per capita barley supply in Ethiopia fluctuated between 11kg and 16kg, with a general upward trend. Other cereals, such as millet, rice, and oats are not commonly consumed despite a slow but steady increase in the supply of millet and rice since 2005. Rice is a recently introduced item in Ethiopia, mostly from imports.

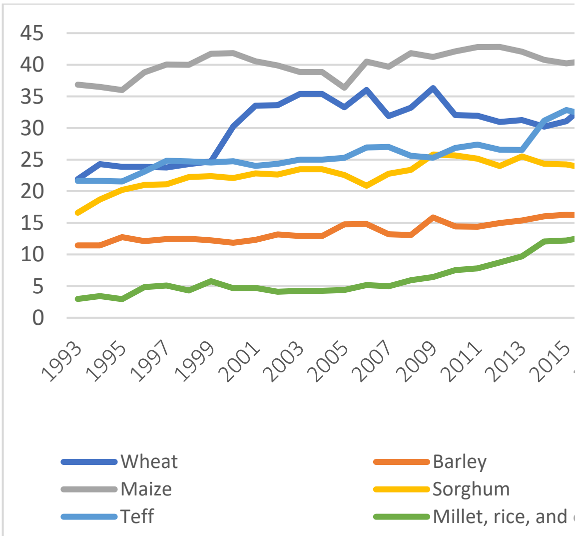


FIGURE 3.16a: TENDS IN CEREALS SUPPLY IN ETHIOPIA BY TYPE (KG/PER CAPITA/PER YEAR)

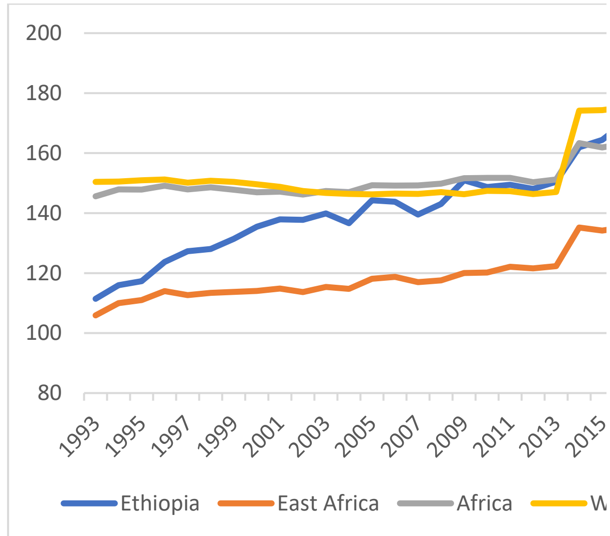


FIGURE 3.16b: TENDS IN CEREALS SUPPLY IN ETHIOPIA, EAST AFRICA, AFRICA, AND WORLD (KG/PER CAPITA/PER YEAR)

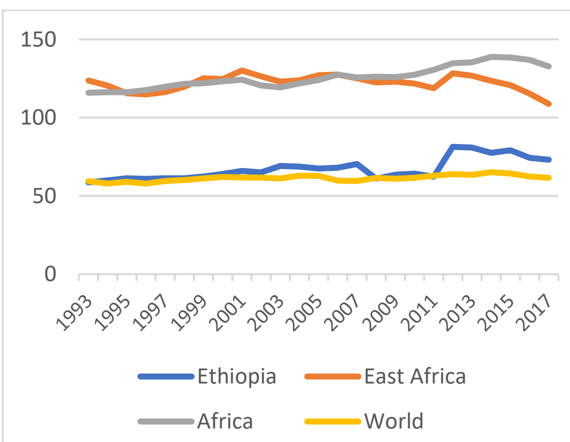


FIGURE 3.16c: TENDS IN CEREALS STARCHY ROOTS SUPPLY (KG/PER CAPITA/PER YEAR)

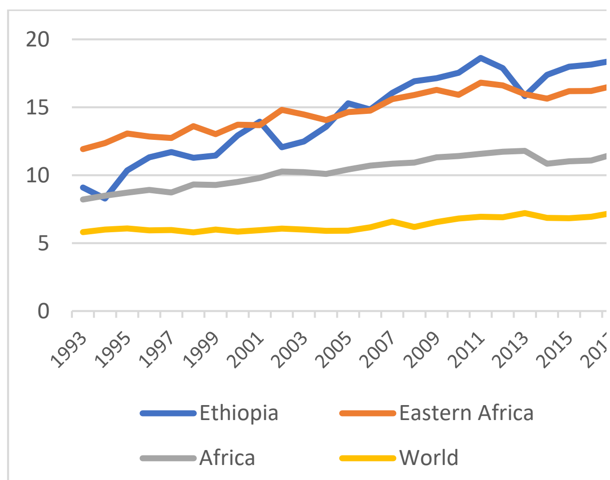


FIGURE 3.16d: TENDS IN PULSES SUPPLY IN ETHIOPIA BY TYPE (KG/PER CAPITA/PER YEAR)

Given that the major sources of calories are cereals in Ethiopia, the share of starchy roots and tubers is exceedingly small, compared to the African and East African averages. During the period between 1993 and 2017, the contribution of roots and tubers to the overall dietary energy supply ranged between 11 to 15%.

Pulses are cost-effective sources of protein, particularly among lower income groups in Ethiopia (IFPRI 2010). The most common types of pulses grown and consumed in Ethiopia include fava beans, chickpeas, lentils, haricot beans, and peas. Pulses are part of the regular diet in the form of *shiro* (powdered pulses) stew, *kik* (split lentil or peas) stew, *nifro* (boiled pulse seeds), or *kolo* (roasted pulse seeds). The per capita supply of pulses, which has been steadily increasing over the last two decades and a half, is higher than the average for Africa and the world average. Pulses constitute between 6 to 8% of the dietary energy supply in Ethiopia.

3.6.2.2 Vegetables and fruits supply

The per capita availability of fruit and vegetables for human consumption remained extremely low in Ethiopia compared to the WHO recommendation and the global and Africa average during the years 2000 to 2017. During this period, the fruit, and vegetables available in the country only met between 11 to 18% of the WHO/FAO recommended daily requirement of 400g/per capita/per day or 146kg/per capita/per year, suggesting that the population in Ethiopia largely lacked the primary source of micronutrients that are essential for human growth and health. The fruit and vegetables per capita per year in Ethiopia increased from 16kg in 1993 to 24kg in 2005 and then dipped to 22kg in 2009. The highest level of availability of fruits and vegetables was registered in 2010, 2011 and 2012 where the annual per capita supply stood at 26kg before the downward trend started in the ensuing years.

The per capita availability of both fruit and vegetables is far lower in Ethiopia compared to the world, Africa, and East Africa averages. Between 1993 and 2017, the available fruit and vegetables in the world showed a steady and strong increase from 136kg/per capita/per year to 217kg/per capita/per year, suggesting that the world, on average, has more fruit and vegetables available than the quantity required to meet the recommended levels. In Africa, although fluctuating from year to year, showed a general increase in fruit and vegetables from 106kg/per capita/per year to 130kg/per capita/per year between 1993 and 2017. Ethiopia has a long way to go to even reach the East African average, which was recorded at 82kg/per capita/per year in 2017. The relatively stagnant and shockingly low level of availability of fruit and vegetables is in stark contrast with the impressive growth in the supply of cereals during the same period. This may suggest that maximum attention has been focused on filling the dietary energy gap, while efforts to fill the nutrient gap are lacking. The exceptionally low consumption of fruit and vegetables is likely to lead to an increased risk of cardiovascular disease, cancer, and all-cause mortality (Aune, Giovannucci, Boffetta, Fadnes, Keum, Norat, Greenwood, Riboli, Vatten & Tonstad 2017Forouzanfar, Alexander, Anderson, Bachman, Biryukov 2015).

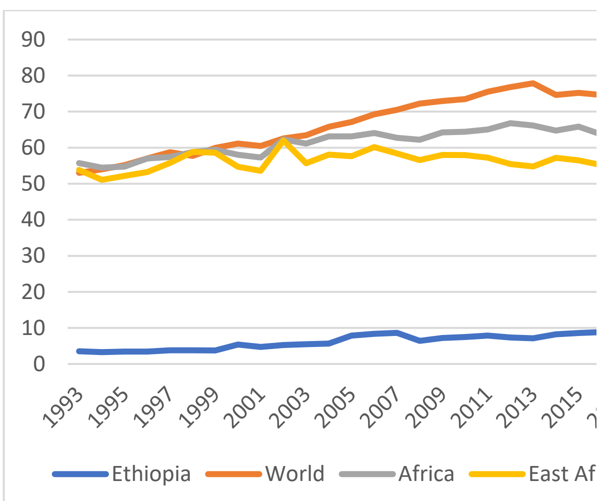


FIGURE 3.17a: TRENDS IN FRUITS SUPPLY (KG/PER CAPITA/PER YEAR)

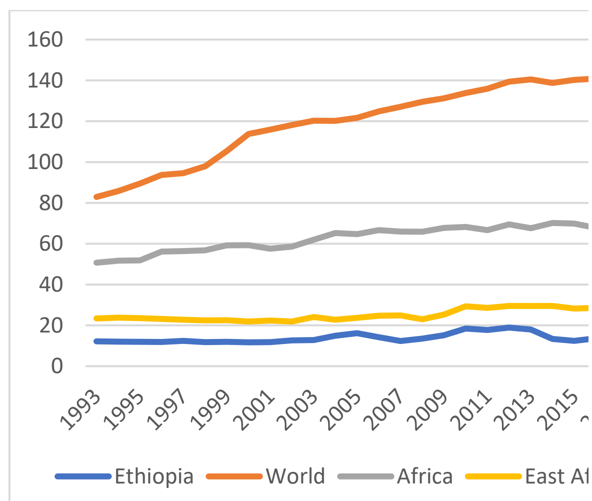


FIGURE 3.17 b: TRENDS IN VEGETABLE SUPPLY (KG/PER CAPITA/PER YEAR)

3.6.2.2 ASFs (meat, fish, eggs, milk, and other dairy products-excluding butter)

One of the key features of the nutrition transition is the increased animal source food consumption. In Ethiopia, the most common sources of meat are cattle, sheep, goat, and poultry (chicken). In the pastoral areas of the Eastern and North-eastern parts of

Ethiopia, camel is also an important source of meat. However, the consumption of pig is prohibited among Christians and Muslims in Ethiopia, and it is not commonly available for consumption. Chicken eggs are also commonly consumed in most parts of the country. The FAOSTAT data on per capita animal source foods in Ethiopia fluctuates from year to year, which does not exhibit a discernible trend to understand the change over time.

To redress the shortcomings emanating from the inconsistencies in the data over time and to obtain a general picture of the changes over time, the yearly data are grouped and averaged in four-year intervals (the latest into a five-year interval from 2013 to 2017). The annual per capita availability of bovine meat, mutton and goat, poultry meat, meats from other sources, and egg did not show much change during the years 1993 to 2012, albeit there is a general upward tendency. The period of 2013 to 2017 saw a decline in the per capita animal source foods. This is surprising given that Ethiopia is first in Africa and 10th in the world, in terms of its cattle population. On the other hand, the supply of milk grew by 129% during the years 1993 to 1996 and 2013 to 2017; the highest availability of milk recorded in the years 2009 to 2012 with 42.1kg/per capita/per year. The availability of fish represents a negligible proportion of the animal source foods consumed in Ethiopia.

Ethiopia has experienced rapid economic growth since 2000 which is expected to trickle the benefits down and increase the income of the people. According to Bennett's Law (1941), as incomes rise, there is a general tendency to change the dietary preference from plant-based foods to animal source foods, since the latter is the desired food for nutritional value and taste. However, the stagnant or slightly fluctuating trend in the per capita availability of animal source foods suggest that the income level has not reached the threshold point that enabled a shift from the traditional starch staples to animal source foods, such as meat, at the national level. However, we cannot rule out that the shift is already taking place among some segments of the population as the data not disaggregated according to `the important socio-economic categories.

Religion plays a pivotal role in the dietary consumption of animal products in Ethiopia. In particular, the followers of Ethiopian Orthodox Church have seven fasting seasons which translate into 156 to 200 fasting days in a year. During the fasting seasons, devout Orthodox Christians abstain from eating meat and dairy products, including butter, milk, and cheese. Most butcher houses and restaurants close or stop selling animal products during these fasting seasons except during the fasting of prophets and fasting of apostles, which limits the consumption of other religion followers as well. Given that Orthodox Christians represent a considerable proportion of the population of the country, the fasting tradition has a substantial impact on supressing the already low overall per capita consumption of animal source foods and shaping the seasonality of consumption.

TABLE 3.4: TRENDS OF ANNUAL AVERAGE ANIMAL SOURCE FOODS SUPPLY QUANTITY (KG/CAPITA/YR), ETHIOPIA

Animal Product	Annual average food supply quantity (kg/capita/yr.)					
	1993 - 1996	1997-2000	2001-2004	2005-2008	2009-2012	2013-2017
Bovine Meat	4.4	4.5	4.7	4.6	4.3	3.6
Mutton & Goat Meat	1.1	1.0	1.1	1.6	1.6	0.8
Poultry Meat	0.6	0.6	0.7	0.6	0.6	0.3
Meat, Other	1.0	1.0	1.2	1.2	1.3	1.1
Offal, Edible	1.2	1.2	1.3	1.5	1.5	1.1
Eggs	0.4	0.4	0.5	0.4	0.4	0.4
Milk - Excluding Butter	15.4	16.2	31.6	35.3	42.1	35.3
Freshwater Fish	0.1	0.2	0.2	0.2	0.2	0.4
Total	24.3	25.0	41.3	45.3	52.0	43.0

Source: FAOSTAT (2019)

3.6.2.3 Vegetable oils, animal fats and sugar

The nutrition transition in developing countries is characterised by an increased consumption of vegetable oils, rather than animal fats like meat and milk (Popkin 2004). As illustrated in Figure 3.17a, the per capita availability of vegetable oil, after remaining flat at an exceptionally low level until 2004, spiked and continued to move steadily upwards. Between 2000 and 2016, the per capita/per year supply of vegetable oil increased by more than threefold (223%), from 1.1kg/per capita/per year to 3.55 kg/per capita/per year. However, the vegetable oil supply in Ethiopia is exceptionally low, and stood at 61% of the average for East Africa, 42% of the average for Africa, and 33% of the global average in 2016.

The common sources of vegetable oil in Ethiopia include sesame seed oil, sunflower oil, soybean oil, palm oil, Niger seed oil, and rape seed oil. However, the dramatic increase in the supply of vegetable oil is primarily driven by the increase in the supply of palm oil. The proportion of palm oil out of the total vegetable oil, calculated using three years' moving average, increased from 12% in 1996 to a staggering 72% in 2015. The concern about the dietary consumption of palm oil is mainly because it has a great deal of saturated fatty acid that increases serum cholesterol. The supply of animal fats, after increasing slowly between 1993 and 2006, steadily decreased giving way to the rise in the supply of vegetable oil. In 2016, the annual per capita supply of animal fats in Ethiopia reached a meagre 0.33 kg, comprising just 3% of the global average.

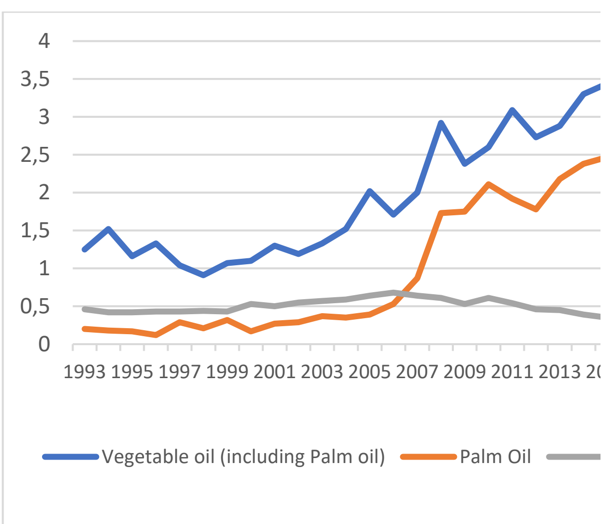


FIGURE 3.18a: TRENDS IN VEGETABLE OIL AND ANIMAL FATS SUPPLY (KG/PER CAPITA/PER YEAR), ETHIOPIA (1993-2017)

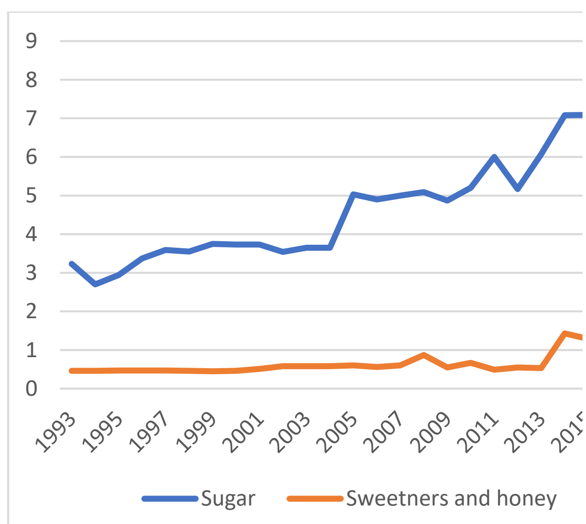


FIGURE 3.18b: TRENDS IN SUGAR SUPPLY (KG/PER CAPITA/PER YEAR), ETHIOPIA (1993-2017)

Source: FAOSTAT (2019)

Raw sugar, honey, and other sweeteners represent around 88%, 11% and 1% of the supply of sugar and sweeteners in Ethiopia, respectively. The annual per capita supply of sugar and sweeteners, after remaining plateaued just below 4kg between 1997 and 2004, spiked to 5kg in 2005 and continued its steady increase and reached 8.3kg in 2017. The principal increase is due to the increase in the supply of raw sugar as opposed to a relatively stable and low supply of honey and sweeteners as sources of dietary energy. Although the per capita supply of sugar and sweeteners increased substantially, its share out of the total energy supply, did not show a meaningful change because of the proportional increase in the total supply of the dietary energy supply over time. The contribution of sugars and sweeteners to the energy supply in Ethiopia, constitutes only 2-3%. This is exceptionally low compared to the share of sugar and sweeteners in East Africa (4 to 5%), Africa (6%), and World (8 to 9%). The average dietary energy derived from sugar and sweeteners in Ethiopia is also generally low compared to the WHO recommendation, which sets the recommended share of sugar and sweeteners at less than 10% (or even less than 5%) of the total energy intake of children and adults (WHO 2015).

The overall meagre level of availability of the most important drivers of nutrition transition, fats, oil, sugar, and sweeteners does not mean that there is no conducive food environment that favours a nutrition transition in Ethiopia, which is associated with the rising incidence of overweight, obesity and non-communicable diseases. The FAOSTAT food supply data is not disaggregated by socio-economic and geographic areas and does not help to understand the dietary changes among specific segments of the population in the country.

3.7 NUTRITION RELATED PROGRAMMES

Nutrition issues had not received sufficient attention until the National Nutrition Programme (NNP) was launched in 2008. The focus of the NNP was to address the under-nutrition among under five-year old children, pregnant and lactating women, and adolescents in rural Ethiopia, albeit recognition was given to the existence of the malnutrition problem in low-income urban areas. The National Nutrition Strategy of 2008 announced that overweight and obesity are being observed and monitoring and appropriate action will be taken without mentioning the action points (FMOH 2008).

The NNP that was revised in 2013, identified programmatic action points to address nutrition-related lifestyle diseases, particularly in urban and semi-urban settings. Among others, the programme intends to adopt actions that increase the public awareness of healthy lifestyles, an increased consumption of fruits and vegetables, a decreased consumption of soda beverages, increased outdoor activities, and a modified school and community environment to promote physical activities, amongst others. (Government of FDRE 2013). Nonetheless, the document does not have clear strategies on how these programme goals can be achieved. Although NNP II has intended to address malnutrition in all its forms through a multi-sectoral approach, its implementation is constrained by challenges, such as, limited leadership, funding, coordination, and incentives for inter-sectoral collaboration (Kennedy, Tessema, Hailu, Zerfu, Belay, Ayana, Kuche, Moges, Assefa, Samuel, Kassaye, Fekadu & van Wassenhove 2015).

3.8 POLICIES GOVERNING THE PRODUCTION, PROCUREMENT, AND SAFETY OF FOOD IN ETHIOPIA

The GoE has put a range of policy tools related to fiscal, trade, social protection, for example, in place to regulate the production, procurement, and safety of food in Ethiopia. These policy tools are found in different documents and are implemented by different government bodies. Some of these policy measures, their implementation, and the implication of the tools for nutrition transition are summarised below.

3.8.1 Segregated privileges of multinational and domestic investors

In Ethiopia, there are business activities reserved exclusively for nationals only. According to Investment Regulation No. 474/2020 FDRE, the following food-related business activities are reserved for domestic investors only: wholesale and retail business, the export trade of raw coffee, khat, oil seeds, pulses, chicken, and livestock; hotels and restaurants (excluding star-designated national cuisine restaurants), tearooms, coffee shops, bars, catering services, bakeries and pastries production for the domestic market (Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia. 2020 b). This means, that, unlike as is the situation in many other African countries, foreign nationals and multinational corporates cannot invest in these activities in Ethiopia.

However, modern supermarkets opened by domestic investors are proliferating in urban Ethiopia, in some instances, taking the names of multinational companies. Furthermore, supermarkets and small convenience shops are increasingly playing a pivotal role in retail imported processed and packed foods and beverages and locally produced vegetables and fruit. Multinational companies have invested in the alcoholic, non-alcoholic beverages, and soft drinks sectors. Particularly in, the beer industry has attracted large companies, such as Heineken (registered in the Netherlands), Diageo (an English company), Bavaria (Netherlands), and Castel Group/BGI (a French beverage company). These foreign companies have purchased already established breweries or built their own factories which gave them to dominate the beer market in Ethiopia, which has an annual growth rate of 20% (Swinkels 2016).

3.8.2 Fiscal measures

The commercial import of processed grocery food items entails duties and taxes, which cumulate around 65% of cost, freight, and insurance value of the item, which is payable at the time of import. Proclamation No. 1186/2020 (Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia. 2020a) points out that excise tax is imposed on items that are deemed as luxury, harmful to heath, causes of social problems, and basic items that are demand inelastic. The tax levied on imported or locally produced food items that are treated as having health hazards is dependent on the type of product. The excise tax levied on edible animal or vegetable fats and oils increases as the level of saturation of fat or the quantity of trans-fat increases. Among others, sugar, chocolate, soft drink powder, all types of pure alcohol, salt, and beer, for example, are subject to different rates of excise tax. This may imply that the GoE is already aware of the negative health consequences of processed foods and taking practical measures to mitigate the exigencies associated with the consumption of these food items.

3.8.3 Urban subsidised food provision

To stabilise the soaring inflation in 2008, the GoE introduced an urban wheat supply subsidy programme through which food is procured from the international market and sold to flour mill factories at subsidized prices. The flour mills, in turn, sell the wheat flour to bakeries or consumers' cooperatives at fixed prices. The bakeries provide bread at prices set by the government. In order to finance the wheat subsidy programme, the GoE has imposed a 10% surtax on items deemed as luxury, including packed foods, beverages, ready-made clothes, and perfumes (Admassie, 2015).

In 2011, with the same objective of stabilizing the market, the GoE also introduced subsidy for palm oil that gave the sole responsibility of importing and distributing palm oil to government-owned firms. This was later revised in 2015 and extended the import license to 10 selected private companies while importing cooking oil other than palm oil is allowable to other import companies without restriction. The government assists the identified palm oil importing companies by providing foreign currency and duty-free privileges so that they can import the desperately needed palm oil. Palm oil reaches poor households at affordable prices through the consumers' cooperatives or Etfruit outlets (Addis Fortune 2019). As measured by cloud point, the standard used to measure the quality of palm oil, Ethiopia imports the least quality palm oil that is registered at the 10th cloud point (Addis Fortune 2019). There is evidence that the palm oil, which is widely consumed by a e large majority of the population in Ethiopia due to its affordability, is a health concern as it constitutes an extremely high content of saturated fat (WHO-FAO 2003; Kadandale, Marten & Smith 2019).

Sugar is also provided through these outlets at subsidised prices. According to the report of the United States Department of Agriculture (USDA 2017), Ethiopia's agriculture imports, which largely comprise palm oil, sugar, and wheat, are growing and reached $1.8 billion in 2015. Despite the fact that the government has introduced a national nutrition programme that intends to promote a healthy diet and lifestyle, the provision of wheat flour, saturated palm oil and sugar at a subsidised price would certainly benefit the food processing industry that provides unhealthy foods, such as soft drink factories, pastries, biscuit factories, and fast-food outlets.

3.8.4 Export ban of cereals

In response to the soaring inflation in 2006, the GoE banned the export of teff, wheat, maize, and sorghum. This measure was further extended to all cereals in 2008. Although the export ban had been partially lifted intermittently in some years since then, it continued to take hold. To buttress the measure further, all cereal products are exempt from tax and, the local procurement of cereals by humanitarian agencies, like the World Food Programme (WFP) had been barred. (Admassie 2015).

3.8.5 Promotion of agricultural productivity

In 2011, the Government of Ethiopia launched a five-year Agricultural Growth Programme (AGP) which intends to increase agricultural productivity and market access for key crop and livestock (MoARD 2013). GTP II sets target to increase fruit production by half and incentive packages for domestic and foreigner investors engaged in fruit production, processing, packaging, and exporting. For importing fresh fruits from abroad, importers should pay 30% import duty, 15% VAT, 10% duty tax, and 3% withholding tax (USDA 2018). According to GTP I and GTP II, the emphasis areas in livestock development include livestock fattening expansion, dairy development technology, better honey production technologies, and poultry resource development.

3.8.6 Food safety and quality

Ethiopian Food, Medicine and Healthcare Administration and Control Authority (FMHACA) was mandated by a parliamentary proclamation and subsequent regulations (Proclamation No 661/2009, Regulation 189/2010, and Regulation 299/2013) to set and implement safety and standards for both locally produced and imported foods, including on production, promotion, storage, packaging and labelling, distribution, and laboratory testing. A new proclamation (Proclamation No. 1112/2019) that revised and restructured the implementing body, was ratified in 2019. Accordingly, the newly set up Ethiopian Food and Drug Authority (EFDA) is mandated to enforce and implement food safety and quality regulations (Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia. 2019).

Among others, the proclamation outlines regulations related to food fortification, food irradiation, food adulteration and counterfeiting, food supplement and genetically modified foods, infant and follow-up formula, and complementary food with the objective of preventing and controlling the public's health from health hazards caused by unsafe food. Foods that are designated as unsafe according to the standards should be returned to its country of origin or disposed of. Additive substances added to foods to give flavour, colour, preserve, and enhance their appearance or other related functional purposes should meet Ethiopian standards. The legislation states that infant and follow-up formula should not be genetically modified or exposed to any radiation during manufacturing, and the source of protein should be indicated clearly.

The Ethiopian Food, Medicines and Health care Administration and Control Authority (EFMHACA) (the former name of EFDA) has prepared and enforced the Food Advertisement Control Directive that intends to curb the possible negative public health consequences stemming from unstandardised and misleading advertisements (EFMHACA 2017). The directive outlines that advertisements related to food will not encourage unhealthy feeding habits and misinform the public. For instance, advertisers cannot claim their product is cholesterol-free or free from artificial additives unless confirmed by the EFDA or a designated regulatory body.

3.9 CONCLUSION

Ethiopia has undergone significant socio-economic and demographic changes since 2000 that are likely to shape the dietary consumption patterns and lifestyles of the people. Despite starting from a low base, the country is experiencing a rapid economic growth and urbanisation rate and demographic transition, and an epidemiologic transition have started taking place. The population dynamics in the country, which are characterised by the high, but declining fertility and an increase in life expectancy owing to a declining mortality rate, gives rise to a rapid but declining population growth rate, and the proportion of the working age population is expanding. The available evidence suggests that Ethiopia is experiencing a transition from predominantly infectious diseases to non-communicable diseases, albeit a double burden of diseases is still dominant. Urban Ethiopia has by a lower rate of natural growth (fertility less mortality), but the overall growth rate is significantly higher than that of rural Ethiopia because of the excessive rural-urban migration, the boundary expansion of towns, and the upgrading of rural areas into towns. The rapid urbanisation trends and income growth may play a pivotal role in changing the food system, particularly in urban areas by increasing the food demand and changing food preferences.

The rapid economic growth since 2000 has translated into consumption growth (and thus income) that triggered the significant poverty reduction, albeit amidst high food inflation. The economy is also experiencing structural transformation, which is being manifested in the expansion of the share of the industry sector from time to time while the agriculture sector is shrinking. The better welfare in urban Ethiopia attracts rural people to urban centres in search of more remunerative non-farm employment, underpinned by the expansion in the construction and manufacturing sectors. This nuanced transformation in the economy coupled with rapid urbanisation is likely to lead towards a dietary transformation and lifestyle changes that favour the process of nutrition transition in Ethiopia. The price environment seems to encourage the thriving of food items associated with a nutrition transition, such as, factory processed wheat products, edible oils, sugar, and beer that have registered a significant drop in real prices during the period under consideration. On the other hand, the real prices of nutritious foods such as *teff,* animal source foods, fruit and vegetables and lentils have been elevated.

Unlike the situation in many African countries, the Ethiopian law does not allow multinational corporates to invest in wholesale and retail business activities in Ethiopia. This law may prevent the rapid expansion of fast-food outlets and supermarkets that sell processed foods (fast foods, snacks, soft drinks) at cheaper prices accompanied by food advertising/promotion influencing food preferences by promoting the desirability of different foods. Nevertheless, modern supermarkets opened by domestic investors and convenience stores are spreading in urban Ethiopia.

Cognisant of the exigencies associated with the dietary transformation and lifestyle changes, the GoE has already incorporated programmatic activities that intend to increase a public awareness of a healthy style, increase the consumption of fruit and vegetables, decrease the consumption of soda beverages, and increase outdoor activities, amongst others. These measures, among others, are related to fiscal, trade and social protection, for example, to regulate the production, procurement, and safety of food in Ethiopia. Nonetheless, the measures taken by the government to provide factory processed wheat flour, sugar, and palm oil at subsidised prices seem to contradict that the NNP intends to discourage the consumption of processed foods.

The analysis of FBS data indicates that the dietary energy supply in Ethiopia has increased significantly over the past two and half decades. However, the dietary energy supply increase largely stems from the growth in starchy staples rather than an increase in fats and oil, sugar, and animal source foods. The continued dominance of traditional starch staples clearly indicates a lack of diversity in the Ethiopian diets.

The relatively stagnant and shockingly low level of availability of fruit and vegetables contrasts with the impressive growth in the supply of cereals during the same period.

From these, it seems that a dietary shift that triggers a nutritional transition, is not yet taking place in Ethiopia as a whole. However, the FBS data that show the aggregate supply at the national level may have masked the differences across socio-economic categories and geographic areas. In particular, the rural and urban disaggregated data are important to assess whether there is a dietary transformation, given that urbanisation is one of the key drivers of the nutrition transition. The deficiency stemming from the nature of the FBS data, which does not clearly depict whether a nutrition transition is actually taking place at individual/ household/ geographic area level, is addressed in the following chapter by analysing the actual consumption of households based on repeated cross-sectional HCES data.

CHAPTER 4: METHODOLOGY

4.1 INTRODUCTION

In this chapter, the methodology of the study is discussed. Multiple primary and secondary data sources and an array of quantitative and qualitative analysis techniques were employed to explore changes and drivers of nutrition transition in urban Ethiopia. The methodological considerations discussed in the chapter cover the research paradigm, study design, quantitative and qualitative data collection approaches, and data analysis. In the analysis section, indicators used to measure the nutrition transition, data transformation issues, the application of a sampling weight, and approaches followed to conduct a hotspot analysis, are deliberated in detail. Finally, the limitations of the study stemming from the nature of the data used and constraints pertaining to methodological issues are presented.

4.2 RESEARCH PARADIGM

Quantitative research entails a relatively large sample size to explore patterns, averages, causal relationships, and generalise results to wider populations using statistical methods. On the other hand, qualitative research usually relies on smaller samples to establish an in-depth understanding of the concepts, nuances, experiences, and stories (Dawadi, Shrestha & Giri 2021). The incompatibility stance in methodology purports that the two orientations cannot mix, because positivism and post-positivism that undergird quantitative orientations and constructivism and interpretivisms that underscore qualitative orientations, are simply too far apart epistemologically (Ghiara 2020).

Recently, the mixed-methods approach that combines both quantitative and qualitative research methods has gained momentum as a distinct research orientation to address complex research questions meaningfully (Fetters 2016). A mixed-methods approach is gaining ground because it provides a better understanding of the research issues than either approach alone (Robins, Ware, dos Reis, Willging, Chung & Lewis-Fernández 2008). According to Feilzer (2010), mixed-methods approaches are logical and practical alternatives that bridge the paradigm wars between the proponents of positivism/post-positivism and constructivism /interpretivism.

This study applied the elements of both the quantitative and qualitative data collection, analyses, and inference techniques to understand the dynamics of nutrition transition in urban Ethiopia. The study pursued pragmatism as the underlying philosophic approach, as opposed to post-positivism and interpretivism, because it was best suited to answer the research questions of the study, by using quantitative and qualitative data. Quantitative methods enabled the researcher to generate data on the levels, trends, and drivers of the nutrition transition in urban Ethiopia, while the qualitative data collected using focus group discussions (FGDs) provided a contextual understanding of the nutrition transition in urban Ethiopia.

In this thesis, the quantitative and qualitative data are presented and analysed separately, and the findings from the two methods are synthesised in the discussion and conclusion sections of the study. This approach was preferred to avoid merging data based on numbers and texts into the same research themes (Dawadi, Shrestha & Giri 2021). Quantification is the dominant strand for this study because the quantitative data can show trends over time, which is essential for depicting a transition. Added to this, the large sample size, vast coverage of the urban settings in Ethiopia, extensive coverage of the study period (2000 to 2016) using repeated cross-sectional surveys allow the quantitative data to hold a dominant position in the study.

4.3 THE STUDY PERIOD

The quantitative data covers the 16-year period spanning the years between 2000 to 2016. The study period is selected because of the availability of large and nationally representative household surveys that can be applied to explore the patterns and drivers of nutrition transition in urban Ethiopia. Added to this, Ethiopia experienced double-digit economic growth from 2003 to 2016. As has been the case in other developing countries, the economic growth of Ethiopia in this period might have had an effect on the dietary consumption patterns of households in urban Ethiopia.

The qualitative data collection was carried out in 2022. This may mean that the changes since 2016 may also have been captured in the qualitative data analysis. Given that the topic of interest, the nutrition transition, is dynamic and evolving over time, it is impractical and may not be strictly necessary to limit the findings of the qualitative study to comply with the study period of the quantitative study that ended some years back.

4.4 STUDY DESIGN

The quantitative component of this study includes multiple rounds of the Household Consumption Expenditure Survey (HCES) and the Demographic and Health Survey (DHS). The two surveys are nationally representative surveys that have been carried out by the Government of Ethiopia and partners in the last two decades. For the qualitative component, FGDs were conducted. The qualitative data were used to explore and obtain an in-depth understanding for the quantitative data. As presented in Figure 4.1, the study applied an explanatory sequential design (Wisdom & Creswell 2013).

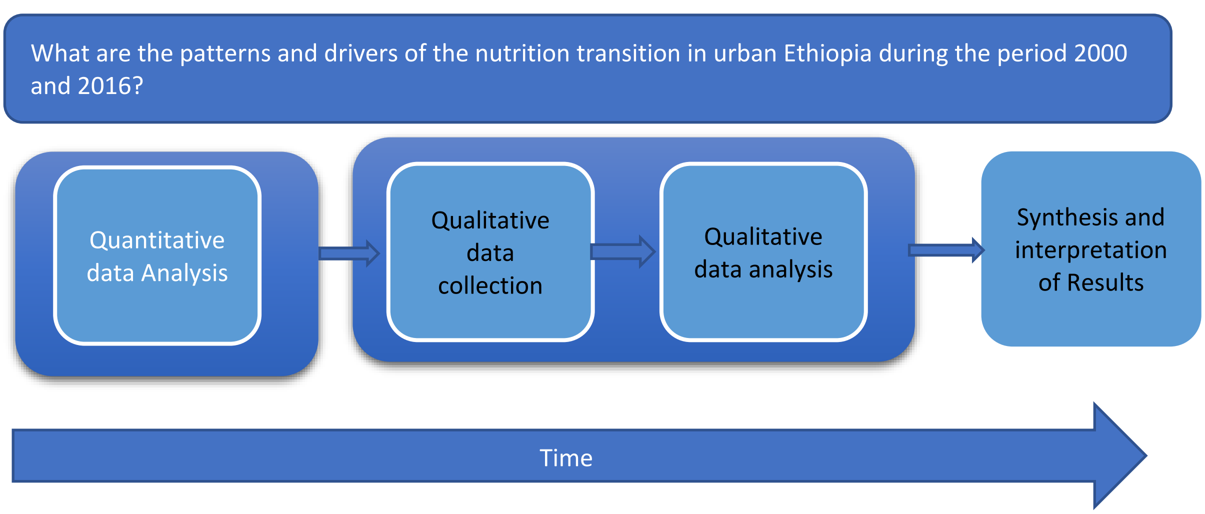


FIGURE 4.1: THE RESEARCH DESIGN MODEL

4.4.1 The quantitative phase

For the quantitative phase of this study, the data available from two nationally representative, cross-sectional, repeated surveys were analysed, namely the HCES and DHS. The researcher obtained cleaned HCES and EDHS datasets, as well as written authorization to use them for the present study from Central Statistics Agency and The DHS Program, respectively.

4.4.1.1 Household Consumption Expenditure Surveys (HCES)

Ethiopia has so far carried out six rounds of HCES in 1994/95 (hereafter, 1995), 1999/2000 (hereafter, 2000), 2004/05 (hereafter,2005), and 2010/11 (hereafter 2011), 2015/16 (hereafter, 2016), and 2021. The sixth round of HCES was carried out between 9 January 2021 to 8 January 2022. However, the data were not available for secondary analysis at the time of this research, therefore, it was not feasible to take advantage of the possibility to extend the study period beyond 2016. The HCES data were collected by the Central Statistical Agency (CSA) and served as the official source for poverty statistics in Ethiopia. Each survey round contained an extensive consumption and expenditure module. The HCES datasets for 2000, 2005, 2011, and 2016 are analysed to explore the nutrition transition in urban Ethiopia.

(i) Sampling design for the HCES

All the HCES conducted employed stratified random sampling to obtain representative samples at national, rural-urban, and regional levels. During the first stage, the country was first stratified into nine regional states and two city administrations. Further stratification of each region was sub-divided into three broad categories: rural, major urban centres and other urban areas. The stratification in the two dominantly urban administrations of Harari and Diredawa followed the rural and urban categories. As Addis Ababa is entirely urban, it was stratified into ten sub-cities. Therefore, each category of a specific region, in most cases, was a survey domain or reporting level for which the major findings of the survey were captured. The lowest reporting levels or survey domains for HCES are therefore these broad categories or strata (CSA 2018).

For HCES, urban centres are divided into two categories: major urban centres and medium and small sized towns. For the major towns category, the nine regional capitals, the Diredawa city administration, twelve additional major towns with a larger population size, and the ten sub-cities of Addis Ababa were covered at the reporting level. The survey was designated to estimate the key indicators for a total of 31 urban centres (including 10 sub-cities in Addis Ababa). The HCES for the major urban centres category, employed stratified two-stage cluster sampling to select the primary sampling units (enumeration area). Sixteen households from each of the primary sampling units (EAs) in each reporting level were selected as a Second Stage Unit (SSU). The second domain, other urbans, were selected from all urbans in the eight regions (other than Addis Ababa, Diredawa, and Harari), using a stratified three-stage cluster sample design. In this case, the primary sampling units were towns, whereas enumeration areas and households were the secondary and third-stage sampling units, respectively (CSA 2018).

(ii) Sample sizes of HCES

The sample sizes (the number of households covered by the surveys) for the HCES increased from 17,332 to 30, 229 between 2000 and 2016. However, because the coverage of the four surveys was similar (major urban areas, rural regions, and other urban areas), the difference in sample size is unlikely to affect the comparability of the welfare measures over time (Stifel & Woldehanna 2017). Over time, the questionnaires were improved to capture food consumption and expenditure information that could be disaggregated for a dietary quality analysis according to the COICOP classifications[3]. For example, the HCES 20116 contains an extensive

[3] The classification of individual consumption according to purpose (COICOP) is the international standard for household expenditure classification. The purpose of COICOP is to offer a framework of uniform categories of products and services that are seen as a function or purpose of household consumption expenditure.

consumption expenditure module consisting of about 740 food items and records of household food consumption over the past seven days.

TABLE 4.1: SAMPLE SIZE COVERED BY THE FOUR ROUNDS OF ETHIOPIAN HCES

Survey Year	Rural	Urban	Sample Households
2000	8,660	8,672	17,332
2005	9,500	12,160	21,600
2011	10,320	17,664	27,834
2016	10,368	19,861	30,229

Source: compiled from HCES reports

Agricultural seasons, holidays, and festivals make a significant difference in the consumption and expenditure patterns and such systematic variations related to the time of the year, month, or week, need to be considered in the survey design and analysis (FAO & World Bank 2018: 52). In order to reduce the bias and measurement errors associated with seasonality, the survey was carried out multiple times over the year.

4.4.2 Ethiopian Demographic and Health Surveys (EDHS)

Ethiopia conducted four rounds of DHS in 2000, 2005, 2011 and 2016 to estimate the key demographic and health indicators including the child and adult nutritional status at country, rural and urban, and regional (for the nine regions and two city administrations) levels. The data set from the four rounds of DHS were analysed for this study, particularly to assess the levels, trends, and determinants of overweight and obesity in both the male and female adult population of urban Ethiopia. DHS data are important to measure this indicator because of the merits of its having been standardised and being a representative sampling of participants, an objective measurement of anthropometric measures, and a high response rate (Corsi, Neuman, Finlay & Subramanian 2012).

(i) Sampling design of the EDHS

The EDHS employed two-stage stratified cluster sampling to draw a representative sample at national, regional, and rural urban levels. The country was structured into nine regional states and two City Administrations Councils (Addis Ababa and Diredawa) that were further stratified into urban and rural areas, except the entirely urban Addis Ababa. Enumeration areas were selected using the probability proportion to size (PPS) method and a fixed number of households were sampled from the selected EAs, using a simple random sampling technique. All women aged 15 to 49 years and all men aged 15 to 59 years in the selected households, were eligible to be interviewed (CSA & ICF 2017). The urban part of the DHS data was extracted to analyse the levels, trends, and determinants of overweigh and obesity in urban Ethiopia.

(ii) Sample size of the EDHS

The total number of urban households, women, and men covered by the four rounds EDHS are presented in Table 4.2.

TABLE 4.2: NUMBER OF INTERVIEWED HOUSEHOLDS, WOMEN, AND MEN IN URBAN ETHIOPIA BY THE FOUR ROUNDS OF EDHS

Survey year	Households	Women	Men
2000	5,232	5,348	3,866
2005	1,629	4,423	3,666
2011	5,112	5,329	4,216
2016	5,232	5,348	3,866

Source: Compiled from EDHS reports

4.4.2 The validity and reliability of data for the quantitative data

The questionnaires and procedures applied by CSA to collect the HCES and EDHS have been adopted appropriately from similar surveys in other countries and continuously refined based on the experiences from previous survey rounds. The collected data were cleaned by professionals with detailed documentation about the data collection and data cleaning processes. In order to obtain a clear understanding of the accuracy of the measurement of variables relevant to this study, discussions were carried out with individuals engaged in the actual design and implementation of the respective surveys. The discussion points entailed issues related to potential sources of error that were important to the interpretation of the variables included in this study. The missing data patterns were explored carefully to assess potential biases and address the gaps properly.

4.4.3 The qualitative phase

To obtain a more in-depth understanding and to explain the quantitative data, qualitative data on nutrition transition were gathered through focus group discussions (FGDs) with individuals from a variety of backgrounds. The FGDs were conducted with selected study participants in Addis Ababa (a big city) and Jijiga and Gode (medium-sized towns in the Somali region). Addis Ababa was selected because it is a metropolitan constituting around one-fifth of the country's urban population, and it is a point of convergence of people from all levels of society. From repeated visit to the Somali region, the researcher observed that the dietary consumption behaviour of the population in the region exhibited distinct characteristics that were evolving rapidly. It appeared worthwhile to explore the dietary transformation in the Somali region of Ethiopia as it could reveal critical features of nutrition transition in Ethiopia. Jijiga and Gode, the two major towns in the region, were purposely selected for the FGD to explore the features of dietary transformation in that part of the country.

Addis Ababa is the capital of Ethiopia hosting around four million inhabitants, one-fifth of the total urban population of the country. According to the population and housing census, three-fourths of the population are followers of Orthodox Christianity, while Muslims, Protestants, and others, constitute the remaining share. The past two decades saw a substantial expansion of the infrastructure, real-estate, and industrial parks, for example, in the metropolis. Addis Ababa hosts the headquarters of international organisations including the African Union (AU) and the United Nations Economic Commission for Africa (UNECA).

Jijiga and Gode are the two major towns in the Somali region of Eastern Ethiopia. The Somali region dominantly has pastoral and agropastoral communities. Most residents of the two towns are from Muslim and Somali ethnic groups. The pastoralist community is linked to the towns as the suppliers of cows' milk and livestock. They are consumers of other foodstuffs and non-food commodities provided in the towns' markets. Both towns are centres of dynamic trade activities integrated into the neighbouring Somalia/Somaliland.

For the data collection in Addis Ababa, participants from six population categories were selected: male taxi drivers (low-income), young male and female daily labourers (low-income), homemakers (middle-income), male and female government and non-governmental organisation (NGO) employees (middle-income), male and female young university students (a high-income group), businesswomen (a high-income group). The FGD sites were selected purposely from the Bole sub-city with many high income, middle-income, and low-income quarters. For the FGDs in Jijiga and Gode, one group each, with women in the age group 46 and above, was arranged. Women in this age group were selected because they were assumed to have knowledge and experience about the dietary change that took place in their community over the past years. In both towns, small groups (mini-FGD) were organised with individuals that had a good and broad level of knowledge and experience regarding the dietary transformation in their areas. All the FGDs included six to seven participants, while each of the mini FGDs was comprised four to five participants. Eight FGDs and two mini-FGDs were carried out for the research project.

TABLE 4.3: FGDS CONDUCTED BY TOWN/CITY AND CATEGORIES

City/Town	Category	Number of participants
Addis Ababa	Low-income male taxi drivers in the age range of 20 to 45	7
	Low-income male and female daily labourers in the age range of 20 to 45 years	7
	Middle-Income homemakers	6
	Middle-income male and female government and non-governmental organisation (NGO) employees	6
	High-income university students in the age range of 20 to 30 years	6
	High-Income businesspeople	6
Jijiga	Middle-income women in the age range 46 and above	7
	Mini-FGD with experts	5
Gode	Middle-income women in the age range 46 and above	7
	Mini-FGD with experts	4
Total number of FGD participants		**61**

4.4.3.1 Discussion guide and procedures

An FGD guide was developed to elicit information on key issues related to knowledge, attitudes, and practices related to food consumption habits at home and away from home, accessibility and affordability of different food items, food choices and food autonomy, and physical activities and lifestyles. The draft FGD guide was piloted in Addis Ababa with middle-income women to check the appropriateness of the research tool (FGD guide) and distil practical preliminary issues-ambiguous questions, questions that could not lead to the intended objective and estimate the amount of time each FGD session would take, for example. The FGD guide was modified and finalized according to the findings from the piloting process.

Two research assistants were recruited based on their previous experience of similar undertakings, educational qualifications, and familiarity with the local customs and language of the study area. They were tasked to consult with local authorities to secure the authorization of the data collection in the community, selection of the participants according to a set of criteria, arrange the venue and refreshment for the discussion, handling the compensation payment for participants. The research assistants visited the selected sites and established contact with knowledgeable people about the area and sought their assistance to recruit potential participants that meet the selection criteria related to income group, age, gender, and social group. Snowball sampling was applied to identify additional participants possessing the required characteristics. The research assistants conducted further screening of the participants to confirm the appropriateness of the potential participants according to the criteria. They explained the objectives of the research to potential participants, confirmed their interest and availability to participate, and arranged the convenient time and venue for the FGDs.

As the study participants convened for the FGD, they were briefed about the purposes of the research project, the nature of the questions, the ground rules, how they were selected as study participants, the expected duration of the session, the risks, and benefits of participating in the discussion. Ethical considerations including confidentiality and its limitations, the voluntary nature of their participation and their right to withdraw at any time while the discussion is progressing were explained to them. Participants who decided to take part in the discussion were given an information sheet to keep and asked to sign a written consent form. Demographic data including age, gender, level of education, and occupation of the participants were collected using a form before the actual discussions were started.

The FGD sessions were facilitated by the principal researcher. The FGDs were tape-recorded, and back-up notes on important points made by the participants and observations about the behaviour and body languages of the participants during the discussion were taken by a second research assistant. The FGDs were conducted in Amharic, the most widely spoken language in urban Ethiopia. In cases whereby participants prefer to explain issues using other local languages, the research assistants assisted in the translation. The moderator motivated all participants to contribute equally to the discussion. To help the participants understand the food items mentioned during the discussion, a picture card showing the pictures and local names of food items included in the FGD guide were displayed during the FGD sessions. At the end of the FGD sessions, the FGD participants received a compensation amounting to 500 Birr per individual to cover the transport cost they incurred to the FGD site and the time they spent for the discussion.

4.4.3.2 Reliability and validity for the qualitative data

There are ongoing debates among researchers about the appropriateness of the terms validity and reliability to evaluate qualitative research (Rolfe 2006; Long & Johnson 2000). In qualitative research, the term validity refers to the validity of the research question for the desired outcome, the appropriateness of methodology for answering the research question, the validity of the methodology, the appropriateness of sampling and data analysis, and the validity of the results and conclusions the sample and context. (Leung 2015). The term reliability is taken as “consistency” in the context of qualitative research (Leung 2015). In this study, the following approaches were employed to ensure the validity and reliability of the qualitative phase:

- The data collection instruments, and the data collection processes were reviewed by experienced researchers on the subject.
- Careful record-keeping was maintained of the processes to ensure the consistency and transparency of data analysis and interpretation.
- The researcher used constant comparison of the data to verify accuracy throughout the data analysis and interpretation.
- Triangulation was used to compare data obtained from various sources.

4.5 DATA ANALYSIS

The quantitative data analysis used different approaches. The indicators used to quantify nutrition transition, data transformation methodologies, and statistical techniques used are all explained in this section. This section also goes into depth about the methodologies used for qualitative analysis.

4.5.1 Quantitative data analysis

Quantitative data analysis was carried out using Stata version 17 (StataCorp. 2021. Stata Statistical Software: Release 17. College Station, TX: StataCorp LLC.). The datasets for each round of HCES and EDHS were organised separately for household level and individual level indicators. Each file has unique identifier variables and the variables that are deemed important for each of these files. The unique identifier variables were used to combine the data extracted from the HCES dataset into one spreadsheet per survey year. The individual level data was used to obtain new variables for household level dataset (e.g., household size, adult equivalent, dependency ratio, etc). Similar procedure was pursued to merge the EDHS data that are available in six separate files as: household, household member, women, children under five, men, and couples.

4.5.2 Measurement of the nutrition transition

The major indicators that were analysed to measure the nutrition transition in Ethiopia are:

4.5.2.1 Quantities of food consumed from distinct categories of foodstuff

The HCES collected information on all types of foods and beverages that make up the country's diets. The food lists are sufficiently detailed to accurately capture consumption of all major food groups. The food items in the list were grouped into categories suitable to measure the nutrition transition, namely, coarse, and processed cereals, animal source foods (ASF), vegetables and fruits, ultra-processed foods, fats, and oils. To calculate the per adult equivalent consumption from various sources, the annual quantities (in kilogram) of each food item consumed by the household members were divided by the household adult equivalent values.

4.5.2.2 Amount and proportion of calories derived from different food items/ categories

The specific food items as quantities consumed were converted into calories using the Food Composition Table of the Ethiopian Health and Nutrition Research Institute (EHNRI 1998). Per adult equivalent calorie per day was derived from each food group was calculated for each household in the survey.

4.5.2.3 Consumption expenditure on different food categories

This indicator shows the economic value of different food items consumed. HCES collected a mix of expenditure and consumption data. The quantity of each food item the household consumed during the recall period from purchase, own production, and received free of charge from a friend, relative, or social programs were collected. To compute the household expenditure, the HCES collected price data for different food items at the nearby markets. The household level consumption expenditure on different food items indicates the estimated money value of the food consumed from purchase, own-produce, and gifts received. To allow comparison over time, consumption expenditures from different rounds of HCES were deflated using the appropriate Consumers' Price Index (CPI) values.

4.5.2.4 Proportion of adult men and women that are overweight and obese according to BMI classification

The BMI is a biometric health measure that indicates body fat and thus serves as a risk indicator of additional chronic conditions (WHO 2018). BMI is calculated by dividing the weight (in kilograms) of an adult by the height (in metres squared). The standard BMI cut-off points that are applicable for adults of both sexes are: underweight (BMI below 18.5); normal (BMI between 18.5 and 24.9); overweight (BMI between 25.0 - 29.9); and obese (BMI of 30.0 and above) (WHO 2005). For this study, the characteristics of individual adults that are overweight or obese according to the BMI classification were analysed to explore the situation in urban Ethiopia.

4.5.3 Data transformation

Data transformation techniques were used to assist generate meaningful and relevant analytical outcomes. The following data transformation techniques were used in this study.

4.5.3.1 Adult equivalent versus per capita food consumption

In this study, most of the indicators are presented in per adult equivalent terms as opposed to the per capita food consumption. The application of the per adult equivalent allows a comparison by accounting for the contribution of household members by age and sex composition to the overall household food consumption pattern, unlike the per capita measurements. In this study, the scale factors as shown in Table 4.4 and extracted from the Federal Democratic Republic of Ethiopia Planning and Development Commission (2018) were applied to construct adult equivalency.

TABLE 4.4: ADULT EQUIVALENT FACTORS

Age range	Male	Female
Below 1 year	0.33	0.33
1 year	0.46	0.46
2 -3 years	0.54	0.54
3 - 5 years	0.62	0.62
6 -7 years	0.74	0.70
8 - 10 years	0.84	0.72
10 - 12 years	0.88	0.78
13 - 14 years	0.96	0.84
15 - 16 years	1.06	0.86
17 - 18 years	1.14	0.86
19 - 30 years	1.04	0.80
31 - 60 years	1.0	0.82
61 and older	0.84	0.74

Source: Federal Democratic Republic of Ethiopia Planning and Development Commission (2018)

4.5.3.2 Deflating nominal prices to real prices

The study period between 2000 and 2016 was ravaged by several episodes of inflation. To compare consumption expenditure over the survey periods, it is necessary to take the relative changes in the prices of the goods and services that households purchase to meet their needs. The consumer price index (CPI), measures change in the price of a basket of goods and services, published by Central Statistics Authority (CSA) for the respective survey periods have been used for adjusting inflation. Thus, the consumption expenditure data in this study reflect the real / inflation adjusted amount of expenditure in terms of the prices in December 2016. To adjust food expenditures, the respective food CPI was applied, while the general CPI was used to deflate the total (food and non-food) expenditure. The formula applied to get the real value (constant Birr) in December 2016 prices is:

$$R_{(Dec\ 2016)} = [N/CPI]*CPI_{Dec\ 2016} \quad \text{(Diewert 2008)}$$

Where:

$R_{(Dec\ 2016)}$ = Real Value in 2016 terms (constant Birr)

N=Nominal value (Current Birr)

4.5.3.3 Transforming some variables into natural logarithms

Some variables that have a skewed distribution in this study were log-transformed using a natural logarithm, which replaces the original continuous data for variable x with a ln(x). Log transformation of some variables (for example, calories consumed, or household expenditure that have few extremely high values) was done to make the skewed distribution "log-normal". Accordingly, the log transformation of these variables lessens the skewness of the original data by replacing them with a log-normal distribution and the regression analysis results from the data become more valid (Benoit 2011).

4.5.3.4 Sampling weights

Both HCES and EDHS have employed multi-stage stratified sampling whereby different units have a different probability of being selected. To account for a sample imbalance stemming from complex sampling designs (as opposed to simple random sampling), sampling weights provided by CSA in the respective datasets were applied to compute unbiased descriptive statistics. In this study, summary statistics such as the average, the sum, and median estimates are computed by applying sampling weights. However, sampling weights were not applied in the regression analysis. Despite the ongoing debate about the use of sampling weight in regression analysis, many studies suggest that unweighted estimates are unbiased, consistent, and have smaller standard errors than weighted estimates (Winship & Radbill 1994; Avery, Rotondi, McKnight, Firestone, Smylie & Rotondi 2019).

4.5.4 Hot spot and cold spot spatial analysis

The 2016 HCES and the four rounds of EDHS collected a spatial dataset, which contains the latitude and longitude coordinates (X, Y) of the households covered by the survey. A hot spot spatial analysis was conducted using the coordinates to identify the clustering of hotspots and cold spots using ArcGIS Pro 2.8.3. To ensure the confidentiality of the respondent households, the DHS provided the data by displacing the GPS latitude/longitude positions of the surveyed households randomly up to 2 kilometres. The researcher found that some households covered in the HCES 2016, lacked coordinates and some data points were significantly displaced. The HCES data dictionary was applied to identify the locations of the households, and random points were generated within the identified administrative boundaries (polygon). The data dictionary of the survey was also applied to identify and rectify the displaced points. The hotspot analysis depicts the locations statistically significant clusters of households with high densities of consumption of food items/groups (using HCES 2016) and the distribution of overweight and obesity (using EDHS, 2000, 2005, 2011, and 2016). A hot spot analysis was performed by computing Getis-Ord G* statistics for every indicator (Ord & Getis 2001). The locations of statistically significant high values (hot spots) and low values (cold spots) were determined on all the maps at the 95% confidence level.

4.5.5 Generalised least squares analysis (GLS)

The HCES dataset collected in different survey years (particularly those related to the calories consumed and food and non-food expenditure) have values that are divergent across years, which created heteroscedasticity errors (unequal variance) when fitting the ordinary least square (OLS) regression for the pooled data (2000, 2005, 2011, and 2016). Homoscedasticity is one of the key assumptions for the OLS estimator to be BLUE (best linear unbiased estimator). To overcome the possibility of heteroscedasticity arising from changes in data collection approaches over time, the Generalised Least Square (GLS) estimator is applied to estimate the determinants of consumption of different food groups/items as measured by the calories, quantities, and expenditure. The interpretation of the GLS estimates was similar to the coefficient interpretation of how a unit increase in one explanatory variable X_i affected the dependent variable Y (Cameron & Trivedi 2005, Chetty & Jain 2017, Davidson, Davidson, MacKinnon & MacKinnon. 2004). The explanatory variables were chosen for model fitting based on the literature and the results from the descriptive statistics.

The GLS model is expressed as:

$$Y_{it} = \beta o + \sum_{i=1}^{k} \beta_i X_{it} + \varepsilon_{it}$$

Where:

- Y_{it} is the dependent variable that measures the consumption of urban household in terms of quantity (kg/AE), expenditure PAE, Calorie PAE, and proportions.
- β_o denotes the constant term of the model result.
- β_i is the respective coefficient of the explanatory variables.
- X_{it} represents potential explanatory variables intended to be considered in the regression. It measures the effect of the variable on the consumption level of urban household i at time t (2000, 2005, 2011 and 2016).
- $\boldsymbol{\varepsilon_i}$ represents the error term of the model that show the unexplained part.

4.5.6 Oaxaca–Blinder decomposition

To examine the drivers of the change in dietary consumption of different food categories (calories derived from refined cereals, quantity of animal source foods consumed, quantities of fruits and vegetables consumed, calories derived from ultra-processed foods, and calories derived from fats and oils) between 2000 and 2016 in urban Ethiopia, Oaxaca-Blinder decomposition of changes in the mean variables was applied. Following suggestions from Headey, Hoddinott, and Park (2016), data from both survey rounds were pooled to estimate the coefficient vector. The decomposition is derived starting from the equation:

$$\textbf{Consumption}_{\textbf{2016}}\textbf{-Consumption}_{\textbf{2000}}\textbf{= X}_{\textbf{2016}}\,\boldsymbol{\beta}_{\textbf{2016}}\,\textbf{-X}_{\textbf{2000}}\,\boldsymbol{\beta}_{\textbf{2000}}\quad \textbf{(Jann 2008).}$$

This equation describes the difference in the average quantities/calories of different food categories between 2000 and 2016 as a function of the means of the explanatory variables (X) and estimated coefficients (β). The Oaxaca-Blinder decomposition separates the change in average consumption into an explained and unexplained part:

$$\overline{\mathbf{Con}}_{\mathbf{2016}} - \overline{\mathbf{Con}}_{\mathbf{2000}} = \underbrace{(\overline{\mathbf{X}}_{\mathbf{2016}} - \overline{\mathbf{X}}_{\mathbf{2000}})\boldsymbol{\beta}_{\mathbf{Pooled}}}_{\textbf{Explained part}} + \underbrace{\overline{\mathbf{X}}_{\mathbf{2016}}(\boldsymbol{\beta}_{\mathbf{2016}} - \boldsymbol{\beta}_{\mathbf{Pooled}}) + \overline{\mathbf{X}}_{\mathbf{2000}}(\boldsymbol{\beta}_{\mathbf{Pooled}} - \boldsymbol{\beta}_{\mathbf{2000}})}_{\textbf{Unexplained part}}$$

The explained portion accounts for the change in consumption between 2000 and 2016 owing to the change in the composition of the explanatory variables (Xs) between 2000 and 2016. The unexplained part represents the change due to the change in coefficients. The explained part can be decomposed further into a sum of contributions of each of the respective covariates. For categorical variables with more than two categories, all the categories are included in the decomposition and the contributions are expressed as deviations from the grand mean following the procedure suggested by Jann (2008). This equation is estimated for the entire sample and for each quintile group.

For ease of interpretation, the percentage share of explained portion and, the percentage share contribution of each predictor in the model in explaining the total change are calculated using the following equation:

$$\textbf{Percent explained (by a predictor)} = \left[\frac{\boldsymbol{Explained\ estimate\ (by\ a\ predictor)}}{\boldsymbol{Total\ change}}\right]\boldsymbol{X}\ \mathbf{100}$$

4.5.7 Probit regression model

Unweighted probit models were estimated to identify the effects of the socio-economic and demographic covariates on the probability of being overweight and/or obese for adult men and women in urban Ethiopia separately. BMI classification of WHO was applied to determine the nutritional status of adult men and women (WHO, 2005). In the probit model, the men and women are classified as overweight or obese if the BMI is between 25.0 and 29.9, and 30.0 and above, respectively, and a value of 1 was assigned to them. For individuals that have a normal BMI of between 18.5 and 24.9 and underweight with a BMI below 18.5, were valued as 0. Hence, the dependent variable of the model could be expressed as a dummy variable.

Mathematically, this is expressed as: $P_i = 1$ if $Y_{i} |z \geq 1$ and $P_i = 0$ if the values are otherwise.
Where:

- Y_i is the BMI of individual i.
- z is the BMI value which equals to 25, so it represents the binary variable measures whether the individual is overweight/obese or not.

The probability, P_i, of the dependent variable being 1 (Overweight/Obese) or 0 (otherwise) can be expressed using the following probit model:

$$P_i = \Pr[Y_{it} = 1|x] = \Phi\,(\beta_0 + \beta_i x_{it})$$

Where:

- Φ is the standard normal cumulative distribution function and the subscript i denote individual men or women.
- β_0 represents the constant.
- β_i is a vector of individual characteristics.
- x_i represent explanatory variables intended to be considered in the regression (Cameron &Trivedi 2005).

Based on the literature and the results from the descriptive statistics, the age, and the age squared, the level of education attained, the marital status, the religion, the occupational position, the household size, the smoking of cigarettes, the number of children born, the frequency of watching television, the frequency of using the internet, and the wealth index of the household are taken as explanatory variables for the probit models. The relationship between continuous and categorical covariates and the outcome of the probability of being overweight-obese is interpreted by transforming probit parameter estimates to marginal effects. The average marginal effect of a categorical variable is the mean change in the predicted probability that the outcome is equal to one as the categorical variable changes from 0 to 1, holding all other covariates at their observed values. The marginal effect of continuous explanatory variables X_k on the probability $P(Y_i = 1|X)$, holding the other variables constant, can be derived as follows:

$$\partial p_i / \partial x_{ij} = \emptyset(x_i'\beta)\beta_j = \phi(\Phi'(P_i))\beta_j$$

Where: $P_i = \Phi(x_i'\boldsymbol{\beta})$

Moreover, ϕ represents the probability density function of a standard normal variable (Greene 2011).

4.5.8 Blinder-Oaxaca non-linear decomposition

To decompose the binary outcome of interest (overweight/obese if BMI≥25, which is designated as 1; normal/underweight if BMI<25 designated as 0) between 2000 and 2016, an extension of Blinder-Oaxaca decomposition technique derived by Fairlie (2005) was applied using estimates from the probit model. Following Fairlie (2005), the decomposition for a nonlinear equation representing the change in the means of over 2000 and 2016 can be represented as:

$$\bar{Y}^{2016} - \bar{Y}^{2000} = \left(\sum_{i=1}^{N^{2016}} \frac{\phi(X_i^{2016}\,\hat{\beta}^{2000})}{N^{2016}} - \sum_{i=1}^{N^{2000}} \frac{\phi(X_i^{2000}\,\hat{\beta}^{2000})}{N^{2000}} \right) - \left(\sum_{i=1}^{N^{2016}} \frac{\phi(X_i^{2016}\,\hat{\beta}^{2016})}{N^{2016}} - \sum_{i=1}^{N^{2016}} \frac{\phi(X_i^{2016}\,\hat{\beta}^{2000})}{N^{2016}} \right)$$

Where:

- N^j denotes the sample size of each DHS survey rounds (j = 2000 or 2016)[4].
- The function $\phi(.)$ represents a probit model.

This equation signifies the difference in the distribution of the outcome variable, the probability of being overweight/obese, over a 16-year period due to the change in the distribution of the vector of the X variables (the first bracket which shows the covariate or explained effect) and the potential effects of differences in the unmeasurable or unobserved returns of the endowments (the second bracket which shows the coefficient effect or unexplained effect). In this case, the coefficient estimates, $\hat{\beta}^{2000}$

[4] For male group the survey periods represent 2011 and 2016.

are used as weights for the 2016 in the decomposition, and the 2016 distributions of the independent variables, X_i^{2016} are used as weights for the second term. This alternative method of calculating the decomposition, commonly provides different estimates, which is a familiar index with the Blinder-Oaxaca decomposition technique.

4.5.9 Gini-coefficients and Lorenz-curves

Gini-coefficients and Lorenz curves were applied to estimate the extent of inequality among households.

4.5.10 Qualitative data analysis

The tape-recorded FGDs were transcribed entirely into text files. The data in the text file were then organised according to the research objectives. The data were then categorised and assigned properties to build on the patterns and gain in-depth insight into the data. The analysis followed producing summaries of findings from each FGD in the light of the research objectives. A thematic analysis was applied to identify, analyse, and interpret patterns of change in nutrition transition-related qualitative indicators. Quotes reflecting the typical views expressed in the FGDs were included to exemplify the emergent themes.

4.6 ETHICAL CONSIDERATIONS

The quantitative data were collected through the household survey after going through the standard government approval processes. The data from the HCES and EDHS have secured consent from the respondents at the time of collection to use the anonymised data (after removing personal identifiers) for secondary research purposes.

For the qualitative data collection process, a range of ethical considerations were considered during the planning, facilitation, data analysis and the report write-up phases. The researcher proceeded to the actual data collection after receiving written approval from the Research Ethics Review Committee of the College of Human Science (CRERC).

While preparing the FGD guide, an effort was made to present the questions in the FGDs not to induce (or have the potential to) distress or cause reputational or professional harm to the participants of the study. Participants were treated with respect, regardless of their socio-economic backgrounds. The participants' information sheet that was translated to the local language of the participants were read to the recruits, and additional information was provided as deemed necessary. The information provided, includes the objectives of the project, how the data generated from the discussion will be used, how long the discussion will take, the potential risks and benefits of participating in the FGD and the ground rules of the discussion, for example. Recruits who agreed to participate were provided with the information sheet and sign on the consent form to conform that they had consented to participate in the FGD voluntarily.

To keep the confidentiality of the participants, the following measures were strictly adhered:

- The research assistants hired to assist in the data collection were trained on the ethical principles guiding the research project.
- The FGD sessions took place at a convenient venue to keep the privacy of the participants.
- The participants were asked to respect the privacy of other focus group members by not disclosing any content discussed during the study.
- In the effort to protect the research participants and the research team against COVID-19, all precautions were put in place during the data collection process, including social distancing, wearing masks, sanitising all surfaces touched by either the research team or the participants.
- No names of the participants were included in any of the research documents. To track each participant, they were given code number, and they were referred to that way in the transcription and report.

- Records that identify participants were available only to people working on the research project (the researcher and his team).

The participants were explicitly informed that the research team could not guarantee fully that other participants in the focus group would treat information confidentially. Accordingly, they were advised not to disclose personally sensitive information in the focus group.

4.7 LIMITATIONS OF THE STUDY

There are limitations in the data used in this study that should be acknowledged so that the data should be interpreted with some caution:

- There are some differences in the different rounds of HCE surveys, which may limit the comparability of the datasets. For example, the HCES conducted in 2000 and 2005 were conducted in two relatively short rounds (July to August and January to February), while the 2011 and 2016 surveys were conducted over the course of a full year (8 July to 7 July). In addition, food price seasonality has a substantial impact on household consumption, food security and nutrition (Dercon & Krishnan 2000; Khandker 2012). This means that the seasonality effect was evened out in the 2011 and 2016 rounds of HCES, but not for the 2000 and 2005 HCES.
- Although the questionnaires in the four rounds of HCES are nearly identical, the item codes used for the expenditure/consumption differ for each of the four survey rounds. In the 2000 round of HCES, only 252 items codes were used, which was increased to 872 in 2005. The item codes included in the 2011 and 2016 rounds of HCES were 653 and 689, respectively. The difference in the list included in different survey years may have its own effect on the level of consumption reported by the respondents.
- The HCES that are used for this study do not contain the individual-level dietary consumption within the surveyed households. Studies suggest that there may be an imbalance in the sharing of household resources (Berti 2012; Haddad, Peña,

Nishida, Quisumbing & Slack 1996; Fiedler & Mwangi 2016). A study in rural Ethiopia by Coates, Patenaude, Rogers, Roba et al. (2018) revealed the existence of significant intra-household nutrient inequities that tended to discriminate against children vis-a-vis adults or adult males, and female children vis-à-vis male children for protein consumption. In the absence of individual level data for intra-household food distribution, calculating the per capita consumption by simply dividing the quantity of food consumed by the household size can lead to less precise conclusions as the average nutrition transition at household level may not show individual level nutrition transition. The qualitative phase was envisaged to compensate for this limitation by providing information on intra-household distribution of food.

- Nutritionists such as Jariseta, Dary, Fiedler and Franklin (2012) and Lividini, Fiedler, and Bermudez (2013), consider a 24-hour recall or observed-weighed food intake record data as the gold standard for food consumption data. In the absence of such data, the researcher used HCES data in this study which provided less precise consumption data.

4.8 CONCLUSION

The methodological considerations of the quantitative secondary data and the primary qualitative data used to investigate the nutrition transition in urban Ethiopia were covered in this chapter. The data sources for the quantitative analysis, data from four rounds of the HCES and four rounds of the EDHS were applied. Due to their large sample sizes and national representation, these datasets were suitable for comparing changes in the indicators of nutrition transition across the research period (2000 to 2016). The consumption of certain food categories, calories originating from those food groups, the amounts of those food groups consumed, and the prevalence of adult overweight/obesity are the indicators used to quantify how nutrition transition is evolving. The data transformation issues covered in this chapter include using adult equivalents, log transformation, deflating nominal prices to real prices, and the sampling weight. Statistical techniques applied are hot spot analysis, GLS regression, Oaxaca-Blinder decomposition, and probit regression. The methodological considerations discussed in this chapter are properly employed in the subsequent two chapters to explore the patterns, trends, determinants, and drivers of the nutrition transition in urban Ethiopia.

CHAPTER 5: RESULTS FROM THE QUANTITATIVE DATA

5.1 INTRODUCTION

The availability of diverse types and categories of foods in Ethiopia from 1993 and 2017 were analysed comprehensively in Chapter 3. The analysis of availability mostly used a time-series food balance sheet (FBS) data compiled by the FAO. However, the FBS data has limitations because it depicts the aggregate supply at the national level that may have masked the differences across socio-economic categories and geographic areas. Given that urbanisation is considered as one of the key drivers of the nutrition transition, the aggregate data at the national level are not sufficient to make claims about dietary changes in urban Ethiopia. The analysis in this chapter intends to address this gap by using household and individual level measurements across different geographic areas. As mentioned in Chapter four, the indicators used to measure how the nutrition transition is evolving are changes in the dietary consumption of diverse types or categories of foods and the nutritional status of men and women between 2000 and 2016 at the level of the individual, households, and geographic area.

5.2 CHARACTERISTICS AND CONSUMPTION EXPENDITURE OF URBAN HOUSEHOLDS

This section investigates the socioeconomic and demographic features, as well as the consumption expenditure and calorie intake, of the study population covered by the four rounds of HCES. The analysis helps comprehension of the context in the analysis in the following sections of this chapter.

5.2.1 Socio-economic and demographic characteristics of the study population

Socio-economic and demographic characteristics of the households are likely to have their own effects in shaping their dietary consumption behaviour. Given the prime roles household heads play in securing income for household consumption, the traits of household heads have their own implications for the dietary consumption patterns of the household members. Table 5.1 presents the characteristics of urban households covered in the survey years of 2000, 2005, 2011, and 2016.

The age composition of households is likely to have its own effect on the dietary consumption patterns. Table 5.1 shows that the mean age of the household head decreased from 43.6 years in 2000 to 39 to 53 years in 2016, implying that the proportion of younger household heads in the last survey was larger. The mean age of the household members ranged between 24 and 25 years, suggesting that the households represent dominantly younger age cohorts. The youthful age dependency ratio, which is the ratio of household members under the age of 15 years and the number of household members in the age range between 15 and 60 years declined consistently from 69% in 2000 to 52% in 2016, which implies that the proportion of under-15 household members were declining consistently while the proportion of household members in the working age was increasing during the survey years. The youth dependency ratio in urban Ethiopia is far below the national average, which stood around 82% in 2016, which may be attributable to the accelerated demographic transition taking palace in urban Ethiopia (see Chapter 3), which could be underpinned by rural-urban migration of the able-bodied young individuals in search of jobs.

In line with the declining trend of fertility rate in urban Ethiopia, the average household size consistently plummeted from 4.56 in 2000 to 3.66 in 2016. The proportion of households with heads in wedlock increased from 57% in 2000 to 59% in 2016. The proportion of households headed by never-married people comprised 9% of the total households and rose to 19% in 2011 and slightly declined to 17% in 2016. At the height of the elevated AIDS-related mortality in urban Ethiopia, the proportion of households with widowed/widower heads upsurged from 5% in 2000 to 17% in 2005 but reduced to 13% in 2011 and subsequently slightly reduced to 12% in 2016.

Households headed by those who had never been to formal schools, dropped from 46% in 2000 to 23% in 2016. On the other hand, household heads who achieved tertiary education increased from 10% in 2000 to 24%, suggesting the increasing level of attaining higher levels of formal education in recent times. This may imply that the households in 2016 were more likely to have a higher chance of a lifestyle moderated by formal education as compared to earlier survey years.

Households in Northern Ethiopia that included Afar, Amhara, and Tigray regions represented between 30% to 32 % of the study population. The share of the study population of residents in Addis Ababa, the largest metropole in the country, progressively declined from 24% in 2000 to 18% in 2016. The largest share (41% to 46%) of the study population were drawn from the Central, South, and Southwest towns. Towns in Eastern Ethiopia covering Diredawa, Hararari, and Somali represented 5% to 6% of the study population.

The share of household heads by employment sector did not seem to be consistent in different survey years.

TABLE 5.1: SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE SURVEYED HOUSEHOLDS

VARIABLES	2000	2005	2011	2016
Mean age of the household head	43.66	41.92	39.43	39.53
Mean age of household members	25.62	24.97	25.43	25.87
Mean household size	4.56	4.30	3.68	3.66
% with male household heads	58	62	63	63
% household heads with no formal education	46	35	30	23
% household heads with primary education	18	22	20	20
% household heads with secondary education	26	30	30	32
% household heads with tertiary education	10	10	20	24
% never married household heads	9	11	19	17
% married household heads	57	58	55	59
% divorced/separated household heads	30	14	13	12
% widowed household heads	5	17	13	12
Youthful age dependency ratio (01-15 to 15-60)	68.7	61.3	55.1	52.0
Old age dependency ratio (60+ to 15 to 60)	9.4	8.3	8.1	8.5
% residing in northern towns	30	30	30	32

VARIABLES	2000	2005	2011	2016
% residing in central, South, and Southwest towns	41	42	46	45
% residing in Eastern towns	6	5	5	6
% residing in Addis Ababa	24	23	20	18
% self-employed	26	2	1	1
% employed in the formal sector	56	50	25	53
% employed in the informal sector	16	22	55	22
Number of cases	8,672	12,160	17,664	19,861

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.2.2 Expenditure per adult equivalent and demographic characteristics

As presented in Table 5.2, the annual real expenditure per adult equivalent (adjusted to the 2016 prices) jumped from 13,340 Birr/AE in 2000 to 20,083 Birr/AE in 2016. This means, the consumption expenditure in urban Ethiopia increased by 51% over the 16 years in real terms. Households headed by males tended to have a relatively higher consumption expenditure compared to women-headed households. The expenditure gap between male-and female-headed households, decreased to 3% in 2011 from 10% in 2000, but further widened to 6% in 2016.

TABLE 5.2: EXPENDITURE AND CALORIE CONSUMPTION OF URBAN HOUSEHOLDS IN 2000, 2005, 2011, AND 2016

HOUSEHOLD CHARACTERISTICS	REAL EXPENDITURE/AE/YEAR (BIRR)				CALORIE/AE/DAY			
	2000	2005	2011	2016	2000	2005	2011	2016
Sex of the household head								
Male	13,742	15,518	15,763	20,466	1,788	2,342	2,701	2,813
Female	12,536	14,346	15,313	19,255	1,914	2,379	2,713	2,922
Age of the household head								
Below 25 years	15,730	19,441	21,787	23,358	2134	2816	3204	3300
25-39 years	14,516	17,009	17,655	22,362	1968	2531	2855	2997
40-59 years	12,574	13,190	13,285	17,605	1713	2227	2524	2648
60 years and above	12,666	15,007	12,789	18,333	1819	2176	2490	2704
Marital status of the household head								
Never married	19,576	23,976	23,647	29,110	2,141	2,681	3,200	3,196
Married	13,190	14,782	14,775	19,727	1,773	2,336	2,659	2,812
Divorced	12,512	16,180	16,241	18,495	1,854	2,483	2,728	2,923
Separated	12,340	13,892	14,828	18,439	1,993	2,465	2,719	3,110
Widowed	13,662	13,108	13,536	17,180	2,056	2,231	2,536	2,729

HOUSEHOLD CHARACTERISTICS	REAL EXPENDITURE/AE/YEAR (BIRR)				CALORIE/AE/DAY			
	2000	2005	2011	2016	2000	2005	2011	2016
Can read and write								
Yes	15,503	17,004	16,965	21,941	1872	2420	2781	2888
No	9,834	11,557	12,199	14,160	1761	2227	2510	2721
Level of education								
No formal education	11,420	12,819	12,351	14,286	1716	2222	2502	2721
Primary education	11,608	13,267	13,656	16,135	1733	2336	2587	2714
Secondary education	15,915	16,972	17,468	21,400	1916	2474	2782	2863
Tertiary education	23,590	23,305	20,796	28,693	2105	2532	3076	3115
Employment sector								
Employer	14,188	17,431	21,642	32599	1807	2,280	2,997	2,978
Private formal sector	15,268	15,014	15,522	21214	1866	2,375	2,672	2,830
Private informal sector	10,285	13,171	17,359	17348	1773	2,336	2,911	2,782
Public and NGO sector	15,499	17,501	13,901	24500	1927	2,453	2,569	3,066
Other	10,563	14,797	-	17215	1670	2,414		2,808
Household size								
1 to 3 members	17,267	22,037	22,283	26,513	2422	2840	3225	3381
4 to 6 members	13,310	14,002	14,072	18,538	1846	2329	2581	2735
7 and more members	11,548	12,416	10,568	14,741	1537	2085	2313	2372
Expenditure PAE Quintile								
Quintile 1(Poorest)	5,050	5,389	6,618	6,036	1,288	1,750	1,871	2,111
Quintile 2	7,893	8,773	10,764	10,322	1,599	2,314	2,542	2,783
Quintile 3	10,903	12,684	14,827	14,701	1,867	2,547	2,990	3,022
Quintile 4	15,990	18,280	21,161	21,953	2,150	2,639	3,321	3,273
Quintile 5 (Richest)	35,037	45,857	42,927	45,297	2,629	3,016	3,814	3,637
Religion								
Orthodox			16,502	21,573			2701	2818
Muslim			13,794	17,624			2625	2768
Protestant and others			14,678	18,501			2849	3067
Total	**13,340**	**15,142**	**15,627**	**20,083**	**1830**	**2354**	**2705**	**2848**

Source: Own calculation using HCES 2000, 2005, 2011, 2016

Households with younger heads (below 25 years) were consistently wealthier than the older households with older heads. The link between the age of the household and expenditure PAE appeared to be non-linear; it first fell and reached a minimum level and finally rose as the household head age increased. This same pattern held true in all survey years except in 2011 when the expenditure per AE consistently decreased as the age group increases without showing the modest increment for the older aged groups (60 and above) in the other survey years. Figure 5.1 explores the non-linear association between household head age and a log of household expenditure per adult equivalent. The two-way quadratic prediction plots depict an inversed-J type of the relationship between the age of the household head and expenditure PAE set at a 95% confidence interval (shaded in grey)

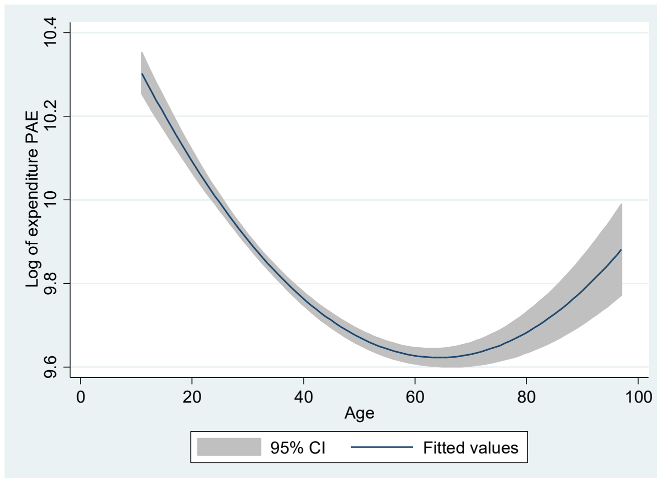


FIGURE 5.1: RELATIONSHIP BETWEEN AGE OF THE HOUSEHOLD HEAD AND EXPENDITURE PAE IN URBAN ETHIOPIA (2016)

Source: Own calculation using HCES 2016

In all survey years, households headed by never-married persons consistently had higher real expenditure PAE, for example, in 2016, the real expenditure was 48%, 58%, and 69%, which was higher than for the married, divorced/separated, and widowed/widower household groups, respectively. There was an overall upward tendency of real expenditure PAE over time in all marital categories, but there was no clear-cut pattern for other marital groups and expenditure PAE.

Having 39% (in 2011) to 58% (in 2000) more real expenditure PAE, households with literate heads had a higher standard of living compared to households headed by persons who could not read and/or write. As the level of education attained by the household head increased the consumption expenditure of the household invariably increased in all the survey years.

In 2016, households headed by men and women who have attained a tertiary level of education spent twice as much on food and non-food items as their counterparts who had no formal education.

The average household expenditure PAE increased rapidly among households in the third and fourth quintile, while a slight improvement was observed among the lower quintiles. The deduction is that the poorest segment of the population had a slight improvement in terms of living standards, while households in the middle-class category witnessed accelerated improvement in the 16-year period between 2000 and 2016.

5.2.3 Food expenditure share and household wealth

Figure 5.2 demonstrates the relationship between expenditure PAE quintile, and the share of the household budget allocated to food. Although the average real household expenditure PAE was noted to have increased consistently between 2000 and 2016, contrary to expectations, the share of expenditure spent on food did not decrease correspondingly. Overall, 45% of the total expenditure was spent on food in 2000, which decreased to 34% in 2005, but increased to 38% and 45% in 2011 and 2016, respectively.

The poorest households (first quintile) allocated 64% of their household budget for food in 2000, which dropped to 46% in 2011, but resurged to 58% in 2016. The resurgence of the proportion of food expenditure in recent survey years may be related to the food inflation in recent years and the shift in the types of food households buy from basic staples that are less expensive to high-value foods. As reflected in Figure 3.11 (in Chapter 3), there were several galloping food inflation episodes, which surpassed the non-food inflation significantly, registered in the country. Particularly, since the global food crisis of 2008, Ethiopia has witnessed years with several episodes of galloping inflation and soaring prices of food.

In all the survey years, the share of total household consumption expenditure spent on food, consistently decreased from the poorest to the richest quintile. The gap between the poorest and the richest quintiles indicates that the poorer households allocate a higher share of their budget on food, while richer households spend relatively lower proportions. In 2016, food expenditure represented about 58% of the household budget of the poorest quintile while the corresponding value for the richest quintile stood at 37%. This is in line with Engel's law that suggests that the share of income spent on food decreases as the income rises (Zimmerman 1932).

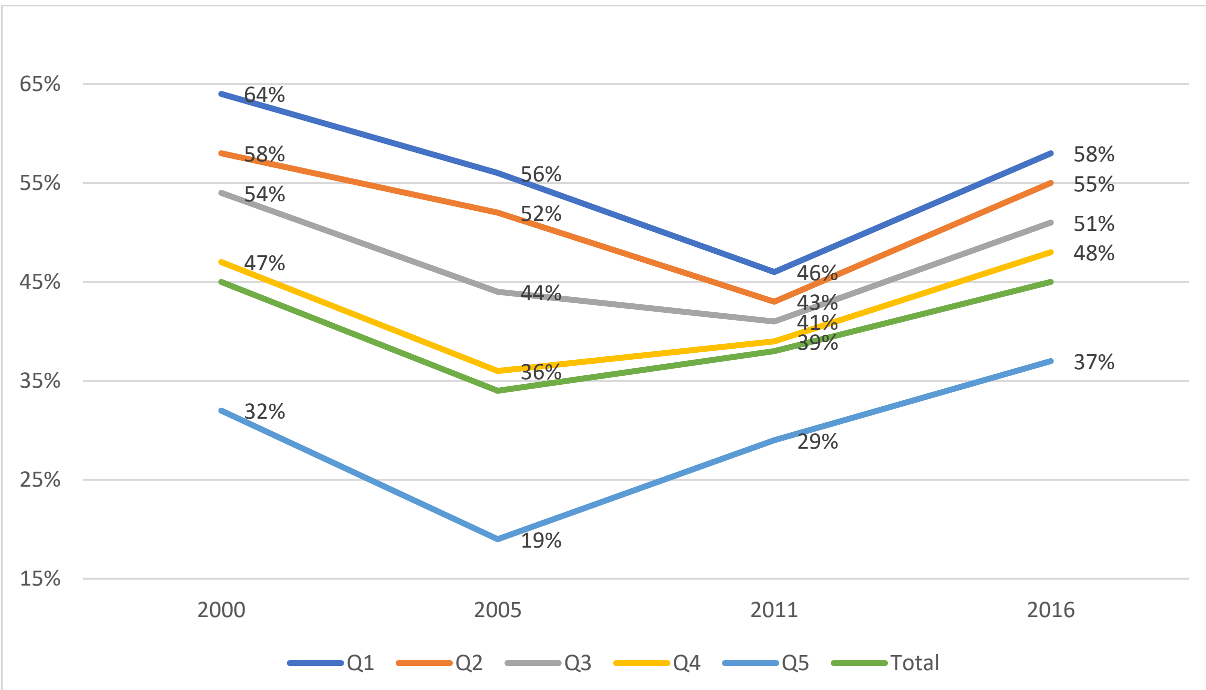


FIGURE 5.2: RELATIONSHIP BETWEEN THE SHARE OF FOOD EXPENDITURE AND EXPENDITURE QUINTILE (2000-2016)

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.2.4 Calorie consumption patterns

Table 5.2 depicts the trends of calorie consumption by the socio-economic and demographic characteristics of the households during the four survey years. During the period between 2000 and 2016, there was an increase in the average calorie consumption from 1830 PAE to 2848 PAE per day, which was a 56% increment. The deduction is that the rapid economic growth registered by the country during the 16-year period has translated into improved dietary consumption patterns for urban households.

Female-headed households, which have a relatively lower total expenditure PAE as compared to their male-headed counterparts, have a consistently higher level of calorie consumption PAE in all survey years. This may be because females are more likely than males to allocate a greater share of their budget to basic household necessities like food for the wellbeing of their household members. It may also have something to do with gender differentiated preferences towards high-calorie foods and consumption at home.

Throughout the survey periods, households led by younger persons (under the age of 25 years), consume the highest average calories, but it decreased consistently as the household head ages. An exception to this is observed in 2000 and 2016, where households headed by elderly people (60 years and above) consumed slightly higher levels of calories than their preceding category (the 40 to 59-year cohorts), reflecting the inversed-J pattern of real expenditure PAE.

Smaller households tend to have a larger average calorie consumption, while it decreases consistently with an increase in the household size category. This pattern that favours smaller households, holds true across all survey years. In all the survey years, the average calorie consumption consistently increased as the expenditure PAE quintile moves from the poorest (Q1) to the richest (Q5) households. Households in the poorest quintile consume the least amounts of average calories, while the richest quintile consumed the highest average calories. Over the period between 2000 to 2016, the average calorie PAE consumption of the first three quintiles (Q1 to Q3) exhibited a continuous increase. On the other hand, the pattern of change among the fourth and fifth quintiles showed a reduction in 2016 after a continuous increase during the first three survey rounds.

The density curves in Figure 5.3 show a significant shift in calorie PAE per day between 2000 and 2016. The density curves for the years 2000, 2005, and 2011 show that the modal values continually progress to the right but are still to the left of the daily calorie requirement line, which is set at 2550 calorie/AE/day as set by the Food and Nutrition Board (1989). In 2016, the calorie consumption distribution differed significantly as it has the highest peak to the right of the calorie requirement line. Overall, this finding clearly confirms that the calorie PAE consumption increased progressively in urban Ethiopia over time.

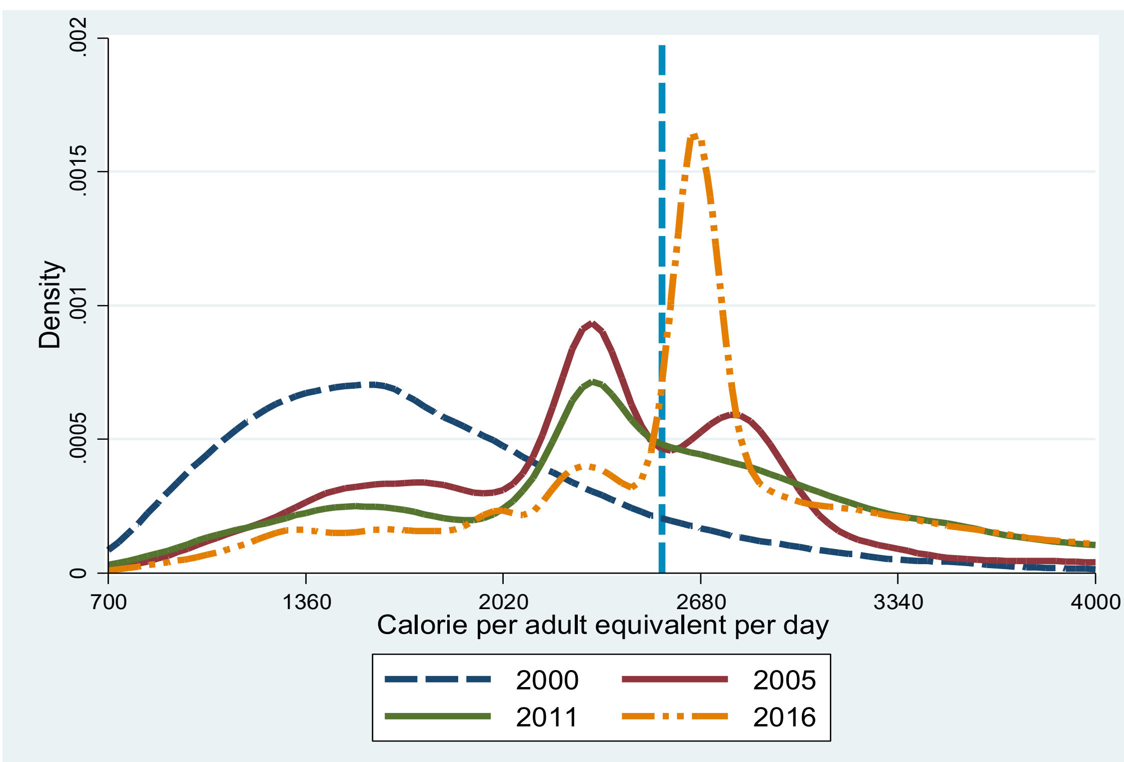
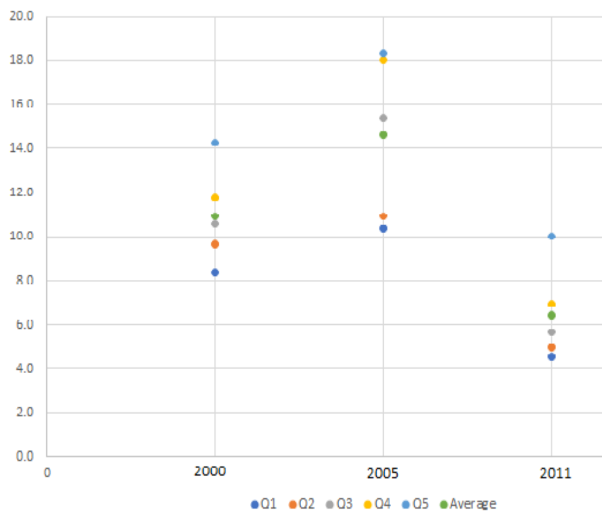


FIGURE 5.3: DENSITY CURVES DEPICTING CALORIE CONSUMPTION PAE (2000-2016)

Source: Own calculation using HCES 2000, 2005, 2011, and 2016

Figure 5.4 depicts the trends of the cost of 100 calories of food the households consumed by quintile and survey year, adjusted to 2016 prices. In all the survey years, the cost of calories consumed increased from the poorest quintile to the richest quintile, suggesting that richer households consumed higher value foods as a source of their dietary energy compared to the poorer households that were dependent on cheaper calories for their consumption. This is further depicted in Figure 5.5 that shows a positive relationship between the values of 100 calories and the logarithm of expenditure PAE. In all the survey years, the gap was excessively large for the fifth quintile and the other quintiles, implying that the richest segment of the population was consuming high-value foods. For example, in 2016, the richest quintile of the urban households spent 172% and 48% more money for a calorie compared to the first quintile and the fourth quintile, respectively. The trend over time indicates that the prices of calories, after rising from 10.9 Birr/1000 calories in 2000 to 14.6 Birr/1000 calories in 2005, plunged to 6.4 Birr/1000 calories in 2011 and increased once more to 9.3 Birr/1000 calories. The average actual price of a calorie consumed by urban Ethiopia households in 2016 was 37% cheaper than the average prices in 2005.



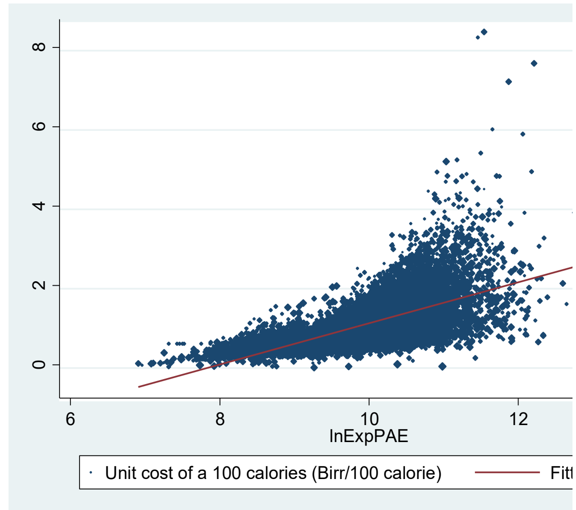


FIGURE 5.4: REAL COST OF 1000 CALORIES (BIRR/1000 CALORIES) CONSUMED BY QUINTILE GROUPS BY SURVEY YEAR (ADJUSTED TO 2016 PRICES)

FIGURE 5.5: RELATONSHIP BETWEEN UNIT COST OF 100 CALORIES (BIRR/100 CALORIES) AND LOGARITHM OF EXPENDITURE PAE IN 2016

Source: Own calculation using HCES 2000, 2005, 2011, and 2016

5.2.5 Changes in consumption inequality in urban Ethiopia (2000 to 2016)

To measure the level of inequality, Gini-coefficients, and Lorenz curves for expenditure per adult equivalent (a proxy for income) have been calculated for urban Ethiopia in 2000, 2005, 2011, and 2016. The Lorenz curve in Figure 5.6 depicts the distribution of consumption expenditure PAE across the cumulative proportion of population. The curve for 2005 is consistently far from the line of equality, indicating that it was the year of the highest inequality. There seems to be higher inequality at the bottom of the consumption expenditure and overlap in the middle with 2016, which has relatively lesser inequality at the higher end of the consumption expenditure. The year 2011 registered the least inequality throughout. As suggested by Kuznets (1955), at a low economic growth level income, inequality is typically low while the economic activities are at low levels, and as the economy starts growing, inequality increases until it reaches a threshold, after which it decreases with the continued economic growth. The trends of inequality in urban Ethiopia seem to follow the inverted U-shaped Kuznets curve over the past sixteen years between 2000 and 2016.

The Gini index in urban Ethiopia, which stood at 0.38 in 2000, rose to 0.41 in 2005 implying that the initial period of the benefits of economic growth at this time did not trickle down to people at the lower income levels. As the rapid economic growth continued and created opportunities and spurred income levels for wage earners, the Gini index in urban Ethiopia dropped to 0.35, but the coefficient resurged to 0.38 in 2016, which may mean that the inequality gap widened once more. Opportunities for daily labour that require low skills proliferated in the construction boom in the first half of the 2010s and triggered an influx of rural migrants to urban areas so that since then, there has been an oversupply of people willing to work for even lower wages, hence the observed rise of inequality in 2016.

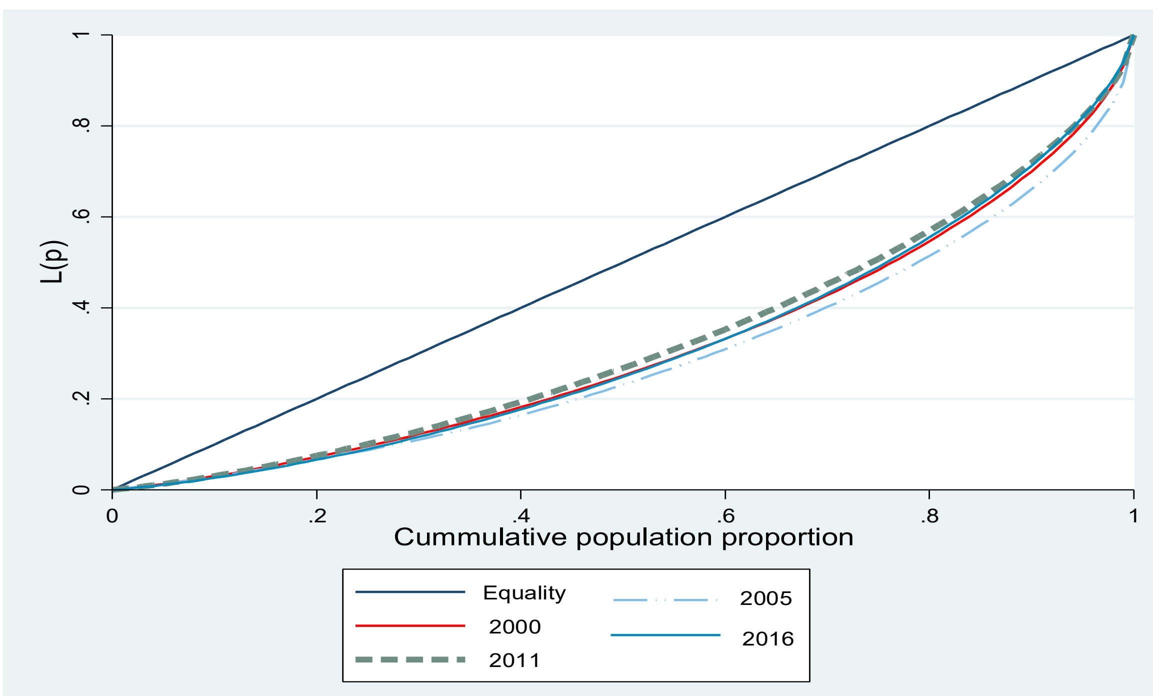


FIGURE 5.6: LORENZ CURVE OF EXPENDITURE PER ADULT EQUIVALENT IN URBAN ETHIOPIA (2000-2016)

Source: Own calculation using HCES 2016

5.3 PATTERNS AND DETERMINANTS OF CEREALS, ROOT CROPS, TUBERS AND STEMS, AND PULSES CONSUMPTION IN URBAN ETHIOPIA

Whole cereals, refined cereals, root crops and tubers and legumes constitute substantial components of diets in Ethiopia, since they are major sources of energy, proteins, and other nutrients. They are staple foods that are consumed daily with most meals, but the proportion varies across geographical locations, cultures, and socio-economic backgrounds. In this section, the patterns of change in the consumption of cereals, root crops, tubers, and stems, and pulses are analysed for the period 2000 to 2016. Consumption is measured using three indicators: consumption expenditure (Birr), quantities of food consumed, and the calories derived from each item by household members. The section also deals with the identification of factors driving the structural change in favour of refined cereals in urban Ethiopia.

5.3.1 Household expenditure on cereals, root crops, tubers, and stems, and pulses

As presented in Table 5.3, the contribution of cereals, root crops, tubers, stems, and pulses in the urban household budget is dwindling as the share of other food groups is increasing. In 2000, cereals constituted as much as 45% of the food budget in urban Ethiopia, while roots and tubers accounted for 3% and pulses comprised 8% of the budget share. However, the share of these items plummeted to 26%, 2%, and 7%, respectively, in 2016. The fall in the share of the household budget allocated for these relatively cheaper sources of dietary energy may be related to a decline in their relative prices compared to other food commodities, diversion to diversified and high-value foods accompanied with a change in tastes and preferences.

The expenditure share of *teff* still represents the dominant household budget share in urban Ethiopia. However, the household food budget share of this most expensive cereal declined from a staggering 22% in 2000 to just 12% in 2016. The share of the food budget spent on coarse cereals (maize, barley, and sorghum, for example), saw a reduction from 6% to 3%, during the time interval. The food expenditure share on wheat grain that does not undergo refining, nosedived from 6% in 2000 to 1% in 2016, to be replaced by refined and processed cereals (which dominantly represent wheat products) that grew from 5% in 2000 to 6% in 2016.

TABLE 5.3: TRENDS OF HOUSEHOLD EXPENDITURE ON CEREALS AND THEIR SHARE IN TOTAL FOOD EXPENDITURE (AT DECEMBER 2016 CONSTANT PRICE)

FOOD ITEMS	2000		2005		2011		2016	
	BIRR/AE /YEAR	% SHARE	BIRR/AE /YEAR	% SHARE	BIRR/AE /YEAR	% SHARE	BIRR/AE /YEAR	% SHARE
Teff -white	447	6%	346	6%	251	4%	471	5%
Teff -mixed	656	9%	386	6%	331	6%	420	5%
Teff- red	448	6%	225	4%	135	2%	152	2%
Teff-total	1552	***22%***	***957***	***16%***	***716***	***13%***	1,043	***12%***
Wheat grain (non-refined)	401	6%	272	5%	147	3%	100	1%
Maize	205	3%	101	2%	102	2%	110	1%
Barley	58	1%	61	1%	43	1%	46	1%
Sorghum	95	1%	94	2%	86	2%	96	1%
Other cereals	75	1%	53.0	1%	18.8	0%	27	0%
Coarse cereals total	433	**6%**	**309**	**5%**	**250**	**4%**	279	**3%**
Bread (bakery)	286	4%	268	4%	172	3%	191	2%
Pasta	77	1%	52	1%	86	2%	142	2%
Rice	32	0%	26	0%	38	1%	88	1%
Factory processed flour	0	0%	0	0%	62	1%	129	1%
Refined Cereals-total	395	5%	346	5%	358	7%	550	6%
Injera (bought from vendors)	83	1%	97	2%	31	1%	55	1%
Bread-local (bought from vendors)	279	4%	335	6%	127	2%	222	3%
Local foods (bought from vendors)	362	5%	432	7%	158	3%	278	3%
Total Cereals	**3143**	**45%**	**2316**	**39%**	**1629**	**29%**	2,249	**26%**
Root tubers and stems mix	193	3%	129	2%	114	2.0 %	195	2%
Starch staples total (Cereals, roots, tubers, stems)	**3,336**	**47%**	**2,445**	**41%**	**1,743**	**31%**	2,444	**28%**
Roasted boiled germinated edible legume mix	196	3%	211.86	4%	32	1%	53	1%

FOOD ITEMS	2000		2005		2011		2016	
	BIRR/AE /YEAR	% SH AR E	BIRR/AE /YEAR	% SH AR E	BIRR/AE /YEAR	% SH AR E	BIRR/AE /YEAR	% SH AR E
Legume used for preparation of sauce mix	340	5%	119.64	2%	379	7%	576	7%
Pulses total	**536**	8%	**332**	6%	**411**	7%	628	7%
Total (cereal, pulses, tubers)	**3872**	**55%**	**2,777**	**46%**	**2154**	**38%**	3072	**35%**

Source: Own calculation using HCES 2000, 2005, 2011, 2016

Figure 5.7 depicts the relationship between the log of the household expenditure PAE and the percentage share of food expenditure on starchy staples that include cereals, root crops, stems, and tubers. The share of expenditure on starchy staples decreases as the log of household expenditure PAE increases. Households that have a relatively higher standard of living level tend to allocate a relatively lower share of their food budget on these basic staples, while poorer households tend to dedicate a larger share of their food budget on these items.

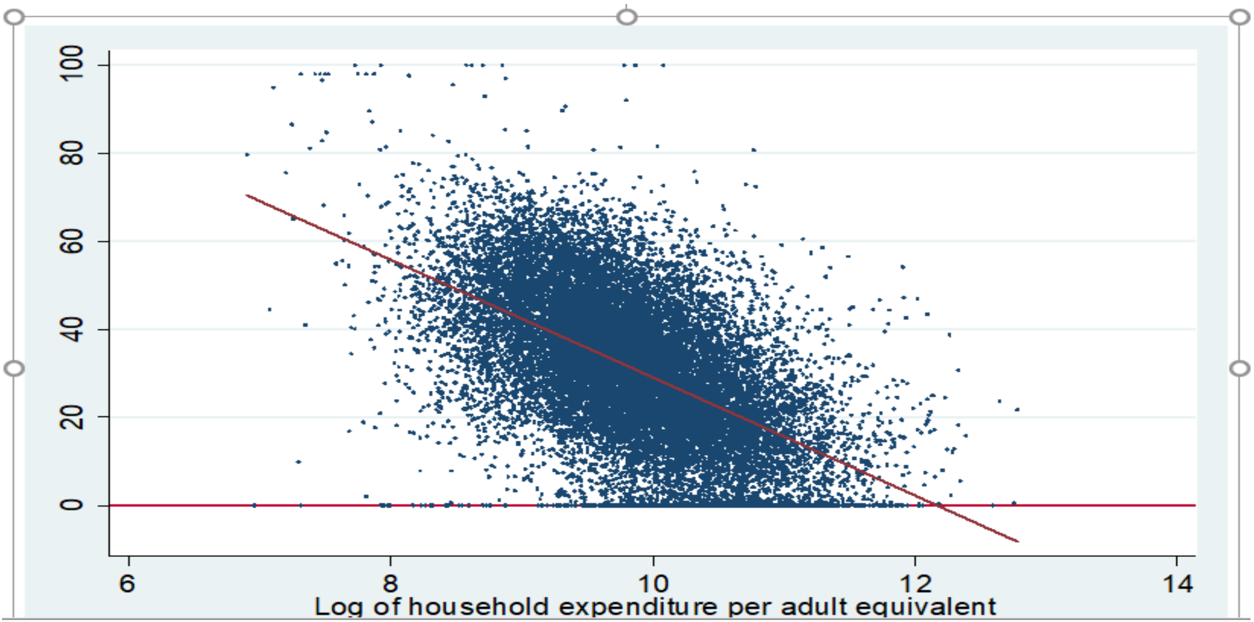


FIGURE 5.7: RELATIONSHIP BETWEEN THE LOG OF EXPENDITURE PAE AND THE PERCENTAGE SHARE OF HOUSEHOLD EXPENDITURE ON STARCHY STAPLES, 2016

Source: Own calculation using HCES 2016

5.3.2 Quantities of starchy staples and pulses consumed

Table 5.4 shows the change in the average quantities of different cereals, root/tuber crops, and pulses consumed by households in urban Ethiopia over the period 2000 to 2016. The consumption of teff, a highly valued cereal, increased between 2000 and 2005 and remained almost stable thereafter. However, there was a significant shift in the variety of teff consumed over time. The average quantities of white teff consumed, the most expensive variant, nearly doubled over the 16 years considered in the analysis, while that of red teff, the cheapest and least preferred variety, decreased almost by half and the consumption of the mixed teff remained almost stable. This means that the consumption pattern changed in favour of white teff, which may be attributable to the income growth and the increased availability and accessibility over time.

The average consumption of *injera*, which is most likely to be prepared from teff, has increased by 27% over the 16-year period, suggesting the increased importance of *injera* prepared outside the home by *injera* vendors, from time-to- time.

The average consumption of coarse cereals, after increasing from 27.1kg/AE/year to 40.8kg/AE/year between 2000 and 2011, declined by 10% to 36.7kg/AE/year in 2016. The pattern holds true for the three most important coarse cereals, maize, sorghum, and barley. Between 2000 and 2016, the average PAE quantities of maize, barley and sorghum consumed rose by 35%, 33%, and 100%, respectively.

Although the average intake of refined cereals, still far smaller than *teff* and coarse cereals, consistently increased between 2000 and 2016. Two of the most commonly consumed refined grain products were white bread and macaroni. The mean quantities of bakery bread consumed PAE in urban Ethiopia increased by 53% between 2000 and 2016. The consumption of pasta, which stood at a mere 1.7kg/AE/year in 2000, rose to 6.4kg/AE/year in 2016, an increase of 276%. The average consumption of rice also increased from 0.8kg/AE/year to 5.3kg/AE/year during the same period. Factory-processed flour, which was almost non-existent until 2005, became the second most important refined cereal in 2011 and 2016. This showed that the importance of refined wheat in the form of bakery bread, pasta, and factory-processed flour was increasing, albeit the consumption of unrefined wheat which may be consumed in the form of traditional dishes, like *nifro* (boiled), *kollo* (roasted), and local bread fell from time-t- time. Similarly, the average intake of local bread (prepared mostly from unrefined wheat and bought from vendors) decreased from 5.3kg/AE/year in 2000 to 4.1kg/AE/year in 2016.

Despite the observed lack of any meaningful change in the average expenditure spent on roots, tubers, and stems during the period under consideration, the average quantities of these items consumed, increased progressively from 21.7kg/AE/year in 2000 to 36.5kg/AE/year in 2016. This may be attributable to the relative decrease in the prices of these starchy staples over time. Pulses that consumed in the form of roasted/boiled legumes and sauce were averaging around 13.7kg/AE/year in 2000 but rose to 19.2kg/AE/year in 2011 and declined slightly to 18.7kg/AE/year in 2016. This implies that pulses continued to be important sources of plant-based protein in urban Ethiopia.

TABLE 5.4: QUANTITIES OF CEREALS, ROOT CROPS, AND PULSES CONSUMED BY TYPE AND SURVEY YEAR (KG/AE/YEAR)

FOOD ITEMS	2000 KG/AE/YEAR	2005 KG/AE/YEAR	2011 KG/AE/YEAR	2016 KG/AE/YEAR
Teff white	16.1	23.7	22.6	29.9
Teff mixed	28.4	30.7	33.6	29.4
Teff red	20.6	18.0	15.0	11.9
Teff-total	65.1	72.5	71.3	71.2
Wheat grain (non-refined)	22.4	25.7	17.5	10.2
Maize	13.3	11.1	20.4	17.9
Barley	2.7	4.5	4.1	3.6
Sorghum	6.5	9.5	13.9	13.0
Other cereals	4.6	5.5	2.4	2.4
Coarse Cereals total	27.1	30.6	40.8	36.8
Bread (bakery)	9.4	11.7	13.6	14.3
Pasta	1.7	2.9	4.4	6.4

FOOD ITEMS	2000 KG/AE/YEAR	2005 KG/AE/YEAR	2011 KG/AE/YEAR	2016 KG/AE/YEAR
Rice	0.8	1.1	2.2	5.3
Factory processed flour	0.0	0.0	5.1	8.7
Refined Cereals total	***34***	***41***	***43***	***45***
Injera (bought from vendors)	16.5	18.3	16.3	20.9
Bread-local (bought from vendors)	5.3	6.0	3.1	4.1
Local foods (bought from vendors)	21.8	24.3	19.4	25.0
Total Cereals	***148***	***169***	***174***	***178***
Roots, tubers, and stems	21.7	27.3	29.8	36.5
Roots, tubers, and stems	21.7	27.3	29.8	36.5
Roasted, boiled, legumes	5.7	8.8	2.6	2.8
Legume for sauce	8.0	6.7	16.6	15.9
Pulses total	13.7	15.5	19.2	18.7
Starchy staples and pulses total	**183.7**	**211.5**	**223.3**	**233.0**

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.3.3 Calories derived from cereals, root crops, tubers, stems, and pulses

The average daily calorie consumption derived from cereals, which stood at 1260 Kcal PAE in 2000, increased to 1551 Kcal/PAE/per day 2016. The proportion of dietary energy derived from cereals decreased from 70% in 2000 to 56% in 2016. Despite the fact that the number of calories derived from cereals was increasing, their share of the total calorie consumption decreased due to the fast increment in the contribution from other food groups. This may mean that the role of cereals as a dietary energy source declined in urban Ethiopia over time in line with the basic tenets of the nutrition transition.

The caloric share of teff declined consistently from 2000 to 2016. Although *teff* was still the dominant source of cereal in 2016, its share declined from 33% in 2000 to 25% in 2016. The relative share of coarse cereals in terms of dietary energy remained more or less stable, constituting between 12% and 14% of the overall dietary energy intake.

The relative share of wheat grain (unrefined), which accounted for 11% of the overall dietary energy intake in 2000, plummeted to only 4% in 2016. On the other hand, the contribution of refined cereals, such as, pasta, bakery bread, rice, and factory processed flours rose steadily from 5% in 2000 to 11% in 2016, implying a steady replacement of wheat grain with wheat products that undergo refining. The findings showed an increase in the consumption of wheat grain, but that it was displaced by refined wheat and other factory-processed cereals. The consumption of factory-processed flours (dominantly sourced from wheat flour) was virtually non-existent in the 2000 and 2005 rounds of the HCE surveys. The rise in the consumption of factory-processed wheat flour as a staple food in urban Ethiopia, coincided with the introduction of the wheat subsidy programme in 2008 that provided factory-processed wheat flour and baked bread to low-income urban households through consumers' associations and bakeries at subsidised prices. Accordingly, the contribution of factory processed cereals was almost zero in 2000 and 2005 and increased to a 2% and 3% share of the overall dietary energy consumption in 2011 and 2016, respectively.

Figure 5.8a and Figure 5.8b represent the distribution of values of calories derived from refined cereals in urban Ethiopia. The distribution of the log of calories of refined cereals PAE per day and the proportion of refined cereals for overall dietary energy progressively shifted to the right from 2000 to 2016. This clearly confirms that the role of refined cereals in absolute calories and their contribution as overall dietary energy was increasing progressively.

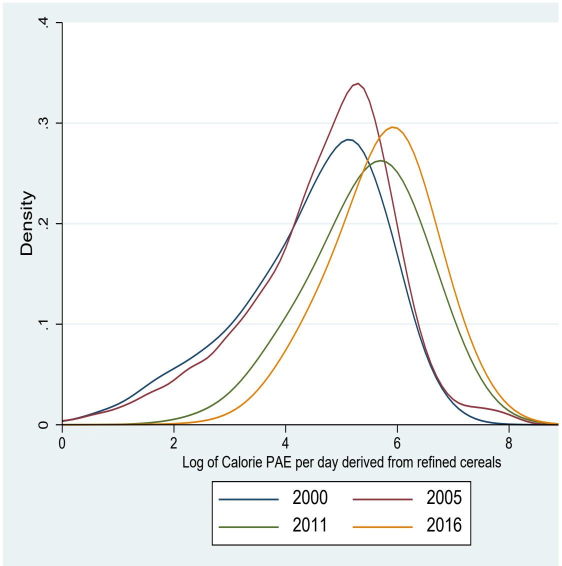


FIGURE 5.8a: DENSITY CURVES DEPICTING THE EVOLUTION OF LOG OF CALORIE DERIVED FROM REFINED CEREALS IN URBAN ETHIOPIA (2000-2016)

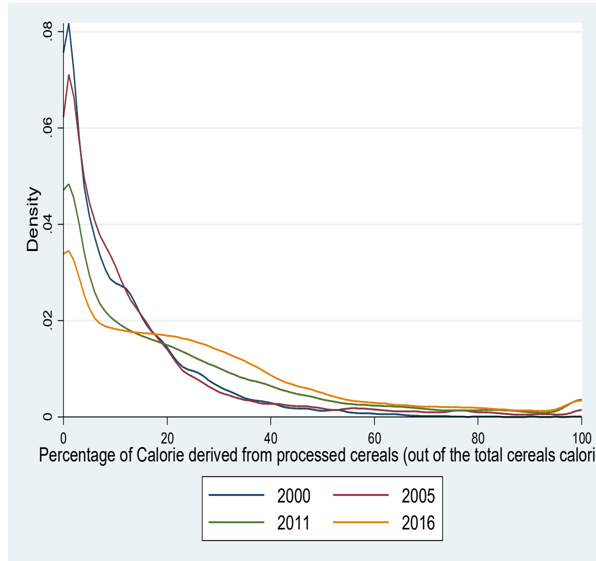


FIGURE 5.8b: DENSITY CURVES DEPICTING THE EVOLUTION OF THE SHARE OF CALORIES DERIVED FROM REFINED CEREALS OUT OF TOTAL CEREALS CALORIES IN URBAN ETHIOPIA (2000-2016)

Source: Own calculation using HCES 2000, 2005, 2011, 2016

The average dietary energy derived from roots, tubers and stems represent between 3% and 4% of the overall calorie consumption. Although the overall calories sourced from these items showed an increment, the percentage share of total calorie consumption trended slightly downwards between 2000 and 2016. The contribution of pulses to the overall calorie consumption constituted between 6% and 7% over the 16-year period. Overall, starchy staples and pulses that comprised nearly 81% of the dietary energy consumption in 2000 decreased to 73% in 2005, 69% in 2011 and 65% in 2016. This clearly indicates that traditional sources of dietary energy were being displaced/replaced by other food categories increasingly and rapidly.

TABLE 5.5: CALORIES DERIVED FROM CEREALS, ROOT CROPS, AND PULSES AND THEIR SHARES (OUT OF THE OVERALL DIETARY INTAKE) BY TYPE AND YEAR

FOOD ITEMS	2000		2005		2011		2016	
	CALORIE/ AE/DAY	% SHARE	CALORIE/ AE/DAY	% SHARE	CALORIE/ AE/DAY	% SHARE	CALORIE/ AE/DAY	% SHARE
Teff white	149	8%	219	10%	222	8%	292	10%
Teff mixed	263	15%	290	13%	329	12%	288	10%
Teff red	189	10%	171	8%	146	5%	116	4%
Teff-total	601	33%	679	31%	696	26%	696	25%
Wheat	201	11%	223	10%	174	6%	101	4%
Wheat-unrefined	201	11%	223	10%	174	6%	101	4%
Maize	133	7%	106	5%	181	7%	162	6%
Barley	25	1%	41	2%	39	1%	34	1%
Sorghum	60	3%	89	4%	140	5%	131	5%
Other cereals	42	2%	43	2%	23	1%	23	1%
Coarse cereals	261	14%	280	13%	383	14%	349	12%
Bread (bakery)	71	4%	80	4%	102.5	4%	108	4%
Pasta	17	1%	28	1%	44	2%	64	2%
Rice	8	0%	9	0%	22	1%	52	2%
Factory-processed flour	0	0%	0	0%	45	2%	77	3%
Refined Cereals total	96	5%	117	5%	214	9%	301	11%
Injera (bought from vendors)	68	4%	80	4%	78	3%	100	4%
Bread-local (bought from vendors)	34	2%	38	2%	19	1%	24	1%
Local prepared foods (bought from vendors)	101	6%	118	5%	97	4%	124	4%
Total Cereals	**1260**	**70%**	**1417**	**64%**	**1564**	**58%**	**1571**	**56%**
Roots, tubers, and stems	72	4%	78	4%	87.8	3%	99	3%
Root, tubers, and stems	72	4%	78	4%	87.8	3%	99	3%
Roasted, boiled, germinated legumes	54	3%	79	4%	23.0	1%	24	1%
Legume for sauce	76	4%	61	3%	160.4	6%	153	5%
Pulses total	130	7%	140	6%	183	7%	177	6%
Starchy staples and pulses total	1462	81%	1635	73%	1835	69%	1847	65%

Source: Own calculation using HCES 2000, 2005, 2011, 2016

Figure 5.9 depicts the relationship between the log of household expenditure and the proportion of calories derived from starchy staples (cereals, roots, tubers, and stems) in urban Ethiopia in 2016. The share of dietary energy derived from cereals and roots, tubers and stems decrease as the consumption expenditure PAE correspondingly increases. The deduction is that households with better incomes tend to diversify their diets while poorer households continue to rely on starchy staples as the major source of their dietary energy.

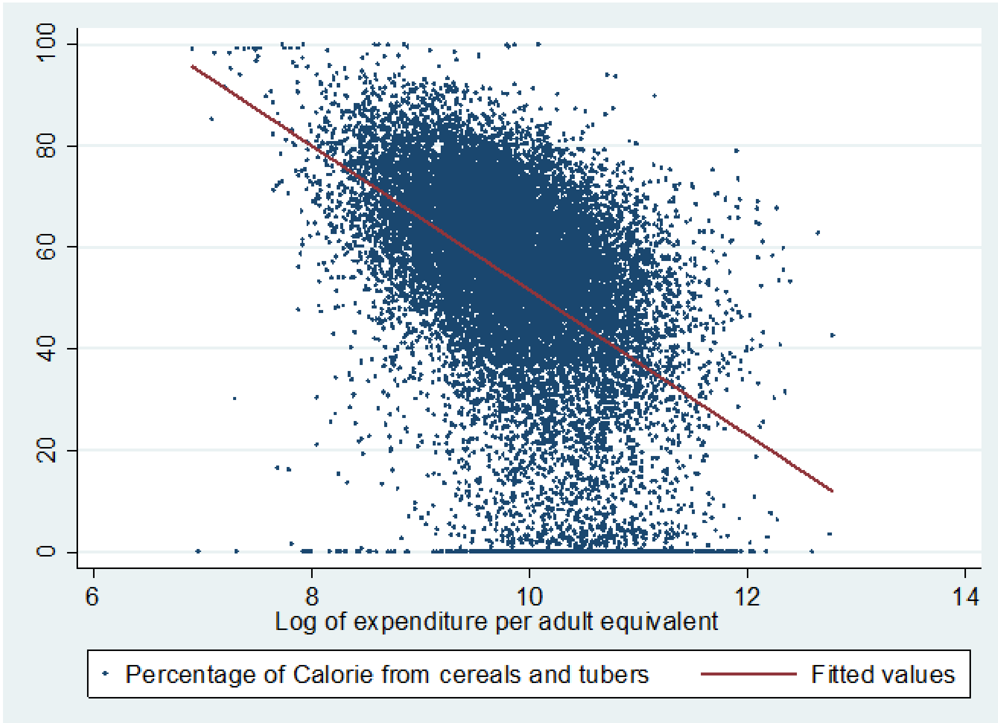


FIGURE 5.9: THE RELATIONSHIP BETWEEN LOG OF EXPENDITURE PAE AND PERCENTAGE SHARE OF CALORIES DERIVED FROM STARCHY STAPLES

Source: Own calculation using HCES 2016

5.3.4 Cereals consumption by expenditure quintile

To understand the consumption pattern of households having various living standard levels, the urban households in the 2016 HCES were categorised into five quintiles each constituting 20% or a fifth of the total number of households based on households' annual expenditure PAE. The first quintile constitutes the poorest segment, while the fifth quintile represents the richest 20% of households in urban Ethiopia. Expenditure in this case, includes the monetary value of purchased and non-purchased food and non-food items consumed, including consumption from one's own production and in-kind payments and transfers.

Overall, the share of calories derived from cereals progressively decreased as we move from the poorest quintile (Q1) to the richest quintile (Q5). Households in the poorest quintile derive about 64% of their dietary energy from cereals, while the share of the richest quintile (Q5) represented around 42% of the dietary energy. The poorest segment of households in urban Ethiopia relied more on cereals for a large share of their dietary energy needs, while the importance of cereals decreased progressively with the rise in households' living standards. Similarly, the share of household food expenditure spent on cereals fell from the poorest to the richest quintiles. The bottom 20% of households spend 40% of their household food budget on cereals, while the corresponding values for the top 20% represented only 14%. On the other hand, the amount of money spent on cereals, increased from the poorest to the richest quintiles. Dividing the total amount of Birr spent on cereals by the number of calories derived from the cereals gives us the average price of cereal calories according to the consumption patterns of households in different quintiles. Based on the cereal consumption pattern of households in the poorest quintile, 1000 calories could cost 3.27 Birr. To acquire 1000 calories from cereals, households in the 2nd, 3rd, 4th, and 5th quintile on the average spend 3.7 Birr, 4.09 Birr, 4.37 Birr, and 4.81, respectively. Households in the richest quintile spend 47% more money to acquire 1000 calories compared to the poorest households, signifying that poor households derived the bulk of their calories from cheaper cereals, while rich households depended on high-value cereals to derive their dietary energy needs.

The share of calories derived from white teff consistently rose from 5% among households in the poorest quintile (Q1) to 14% in the richest quintile (Q5). The share of calories from mixed teff is relatively large in the middle expenditure quintiles (quintile 2 to 4) while it is relatively smaller in the poorest and the richest quintiles. Red teff is dominantly consumed by households in the poorest expenditure quintile. This means, white teff is largely consumed by the richest households while households in the middle expenditure quintiles dominate the consumption of mixed teff. On the other hand, red-teff, which is relatively cheaper in its price, is by and large consumed by the poorest quintile.

The share of calories derived from coarse cereals such as maize, sorghum, and barley consistently decreased as we move from the poorest to the richest quintiles. This means, richer households in general, consume lower quantities of coarse cereals compared to poorer households. The poorest households constituting the bottom 20% are five and half times more likely to meet their dietary energy needs from coarse cereals as compared to the richest quintile. Coarse cereals represented around a quarter of the dietary energy sources for the poorest segment of the households, while it represented only 3% of the calories consumed among the richest quintile households. Maize is the most important coarse cereal that contributed around 14% of the calorie supply of the poorest segment of households, followed by sorghum that contributed around 8% of the dietary energy needs of the lowest expenditure quintile. The poorest quintile households on average spent 9% of their food expenditure on coarse cereals, while the richest quintile allocates just 1% of the household food budget on these relatively cheap cereals.

Households in all categories on average, derive 8% to 12% of their caloric needs from refined cereals, such as, factory processed flour (mostly wheat flour), bakery bread, rice, pasta, and macaroni. However, there were notable differences in terms of the types of refined cereals households consumed dominantly. The proportion of calories derived from such items, as rice and factory-processed flour increased as we move from quintile one to quintile four and decreased at the fifth expenditure quintile. The same was true for pasta, except that it tended to increase among households in the highest quintile. Households in the lowest quintile, on average, consumed 29 kcal/adult equivalent per day as compared with 91 kcal/adult equivalent per day in the richest quintile. On the other hand, the calorie share derived from wheat grain was highest among the households in the poorest quintile and decreased consistently to the richest quintile. Thus, in terms of calories arising from refined cereals, there were no significant differences between the poor and the rich quintiles. However, the poor tended to dominate in wheat grain, while the richer households tended to consume more processed cereals.

Cereal foods, such as *injera* and bread prepared and sold by vendors constituted between 4% and 5% of the total calorie consumption in all quintiles, implying the importance of prepared cereals in the diets of both rich and poor households in urban Ethiopia. However, the quantities of calories derived, and the amount of money spent on these items generally increased as one goes from the poorest quintile to the richest quintile. Households in the poorest expenditure quintile, on average, spent 192 Birr/AE/year to buy 19kg of cereal food items from vendors, far lower than households in the richest quintile that dedicated 378 Birr/AE/ year for 31kg food.

The annual PAE consumption of roots, tubers, and stems was, by and large, similar in terms of quantity among the first three quintiles. The quantities consumed were slightly smaller among the 4^{th} and 5^{th} quantiles. The bottom three quintiles, on average, derived 58 to 61 calories per day, from roots, tubers, and stems. For the upper two quintiles, the average daily intake of roots, tubers, and stems contributed around 50 calories. The poorest quintile acquired 3% of their dietary needs from these starchy staples, while the richest quintile relied on these items for just 1% of their energy requirements. This implies that roots, tubers, and stems constituted a relatively smaller proportion of the dietary energy needs of the rich and the poor, but their role was relatively larger for the poor compared to richer households.

Households in the 2^{nd} to 5^{th} quintiles, on average, consumed 19 to 21kg/AE/year of pulses. The poorest quintile had an average consumption of 14.7kg/AE/year, which was relatively smaller than the other quintiles, but was still substantial. This clearly indicated that pulses were widely consumed among all households regardless of their economic status. This may reflect the culture of consuming pulses in different forms (mostly in the form of stews or curries) in regular meals. Pulses represent between 5% of the household food budget among the poorest quintile to 10% of the food budget of the poorest quintile.

TABLE 5.6: CONSUMPTION OF CEREALS, ROOT CROPS, AND PULSES BY EXPENDITURE PAE QUINTILES

Type of Cereals	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Kg /AE/ year	Kg /AE/ year	Kg /AE/ year	Kg /AE/ year	Kg /AE/ year	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share
	Q1		**Q2**		**Q3**		**Q4**		**Q5**		**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q1**		**Q2**		**Q3**		**Q4**		**Q5**	
White teff	162	4%	381	6%	517	6%	708	6%	875	5%	11	25	33	44	53	107	5%	249	9%	325	11%	429	13%	516	14%
Mixed Teff	267	6%	467	7%	511	6%	506	4%	398	2%	19	33	36	35	26	183	9%	328	12%	353	12%	343	11%	259	7%
Red teff	180	4%	169	3%	148	2%	127	1%	100	1%	14	14	12	10	7	139	7%	132	5%	114	4%	97	3%	69	2%
Teff and Other cereals mix	11	0%	11	0%	9	0%	7	0%	0	0%	1	1	1	1	0	9	0%	10	0%	6	0%	5	0%	0	0%
Teff Total	**619**	**15%**	**1029**	**15%**	**1185**	**13%**	**1349**	**11%**	**1373**	**7%**	**45**	**74**	**82**	**89**	**86**	**438**	**21%**	**718**	**26%**	**798**	**27%**	**874**	**27%**	**845**	**23%**
Wheat grain (unrefined)	123	3%	126	2%	87	1%	68	1%	74	0%	13	13	9	7	6	133	6%	128	5%	86	3%	66	2%	58	2%
Wheat grain - total	123	3%	126	2%	87	1%	68	1%	74	0%	13	13	9	7	6	133	6%	128	5%	86	3%	66	2%	58	2%
Barley	44	1%	47	1%	41	0%	49	0%	49	0%	4	4	3	3	3	43	2%	37	1%	27	1%	30	1%	27	1%
Maize	194	5%	123	2%	77	1%	47	0%	49	0%	33	20	12	7	5	305	14%	185	7%	110	4%	64	2%	37	1%
Sorghum	126	3%	113	2%	98	1%	73	1%	42	0%	17	16	13	10	5	175	8%	159	6%	132	4%	96	3%	52	1%
Coarse Cereals	**365**	**9%**	**283**	**4%**	**216**	**2%**	**169**	**1%**	**139**	**1%**	**55**	**40**	**28**	**20**	**13**	**523**	**24%**	**381**	**14%**	**269**	**9%**	**190**	**6%**	**116**	**3%**
Bread-bakery	119	3%	178	3%	227	3%	239	2%	238	1%	9	14	17	18	17	67	3%	103	4%	129	4%	135	4%	130	4%
Factory Processed Flour	74	2%	122	2%	157	2%	173	1%	151	1%	5	8	10	12	10	44	2%	75	3%	93	3%	103	3%	88	2%
Rice	65	2%	95	1%	104	1%	104	1%	79	0%	4	6	6	6	4	39	2%	57	2%	61	2%	60	2%	43	1%
Pasta	63	2%	133	2%	161	2%	198	2%	220	1%	3	6	7	9	9	29	1%	64	2%	73	2%	88	3%	91	3%

Type of Cereals	**Birr /AE/ year**	**% Share**	**Birr /AE/ year**	**% Share**	**Birr /AE/ year**	**% Share**	**Birr /AE/ year**	**% Share**	**Birr /AE/ year**	**% Share**	**Kg /AE/ year**	**Kg /AE/ year**	**Kg /AE/ year**	**Kg /AE/ year**	**Kg /AE/ year**	**Kcal /AE/ day**	**% Share**	**Kcal /AE/ day**	**% Share**	**Kcal /AE/ day**	**% Share**	**Kcal /AE/ day**	**% Share**	**Kcal /AE/ day**	**% Share**
	Q1		**Q2**		**Q3**		**Q4**		**Q5**		**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q1**		**Q2**		**Q3**		**Q4**		**Q5**	
Refined Cereals	321	9%	528	8%	649	8%	714	6%	688	3%	21	34	40	45	40	179	8%	299	11%	356	11%	386	12%	352	10%
Injera	156	4%	193	3%	242	3%	265	2%	324	2%	16	20	22	24	27	75	4%	96	3%	106	4%	115	4%	128	4%
Bread-home made	36	1%	64	1%	62	1%	68	1%	54	0%	3	5	5	5	4	16	1%	29	1%	27	1%	27	1%	22	1%
Prepared Cereals	192	5%	257	4%	304	4%	333	3%	378	2%	19	25	27	29	31	91	5%	125	4%	133	5%	142	5%	150	5%
Other Cereals	13	0%	14	0%	17	0%	17	0%	27	0%	2	1	2	1	1	2	0%	5	0%	6	0%	7	0%	10	0%
Other Cereals Total	**13**	**0%**	**14**	**0%**	**17**	**0%**	**17**	**0%**	**27**	**0%**	**2**	**2**	**2**	**1**	**1**	**2**	**0%**	**5**	**0%**	**6**	**0%**	**7**	**0%**	**10**	**0%**
Total Cereals	**1637**	**40%**	**2244**	**33%**	**2466**	**27%**	**2658**	**22%**	**2695**	**14%**	**154**	**188**	**188**	**190**	**178**	**1371**	**64%**	**1662**	**60%**	**1651**	**55%**	**1667**	**51%**	**1535**	**42%**
Roots, tubers, and stems	124	3%	166	2%	180	2%	183	2%	186	1%	28	29.9	29.4	26.3	25	61.3	3%	60.3	2%	58.2	2%	49.5	2%	50	1%
Roots, tubers, and stems	124	3%	166	2%	180	2%	183	2%	186	1%	28	29.9	29.4	26.3	25	61.3	3%	60.3	2%	58.2	2%	49.5	2%	50	1%
Roasted, boiled, germinated legumes	40.8	1%	44.4	1%	58.3	1%	67.1	1%	64.8	0%	3.2	2.61	3.0	2.7	2.2	27.4	1%	22.5	1%	25.9	1%	23.7	1%	19.5	1%
Legume for sauce	367	9%	558	8%	653	7%	691	6%	763	4%	11.5	16.4	17.9	17.9	18.2	111	5%	157	6%	172	6%	172	5%	176	5%
Pulses total	408	10%	603	9%	712	8%	758	6%	827	5%	14.7	19	21	20.6	20.4	138	7%	179	6%	198	7%	196	6%	195	5%

Type of Cereals	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Birr /AE/ year	% Share	Kg /AE/ year	Kg /AE/ year	Kg /AE/ year	Kg /AE/ year	Kg /AE/ year	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share	Kcal /AE/ day	% Share
	Q1		**Q2**		**Q3**		**Q4**		**Q5**		**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q1**		**Q2**		**Q3**		**Q4**		**Q5**	
Starchy staples and pulses total	**2169**	**53%**	**3013**	**44%**	**3358**	**37%**	**3599**	**30%**	**3708**	**20%**	**197**	**237**	**238**	**237**	**223**	**1570**	**73%**	**1902**	**69%**	**1907**	**63%**	**1912**	**58%**	**1781**	**49%**

Source: Own calculation using HCES 2016

5.3.5 Hot spot spatial analysis of processed cereals

Figure 5.10 reveals the hot and cold spots of the percentage of calories derived from refined cereals out of the total cereal calories. The hot spots indicative of clustering of the consumption of refined cereals is found in Diredawa, Harari, Eastern Afar and Somali areas of Eastern Ethiopia, with a significance at the 95% confidence level. These are areas near neighbouring countries where the consumption of processed cereals is common with the ready availability of outlets selling such products. There are also hot spots in Southern and Southwest Ethiopia. Most parts of Amhara, Tigray, Central Oromiya, and Northern SNNP are statistically significant cold spots at the 95% confidence level. These are areas where whole cereals (teff, maize, wheat, sorghum) are consumed dominantly, with a corresponding lower consumption of refined cereals.

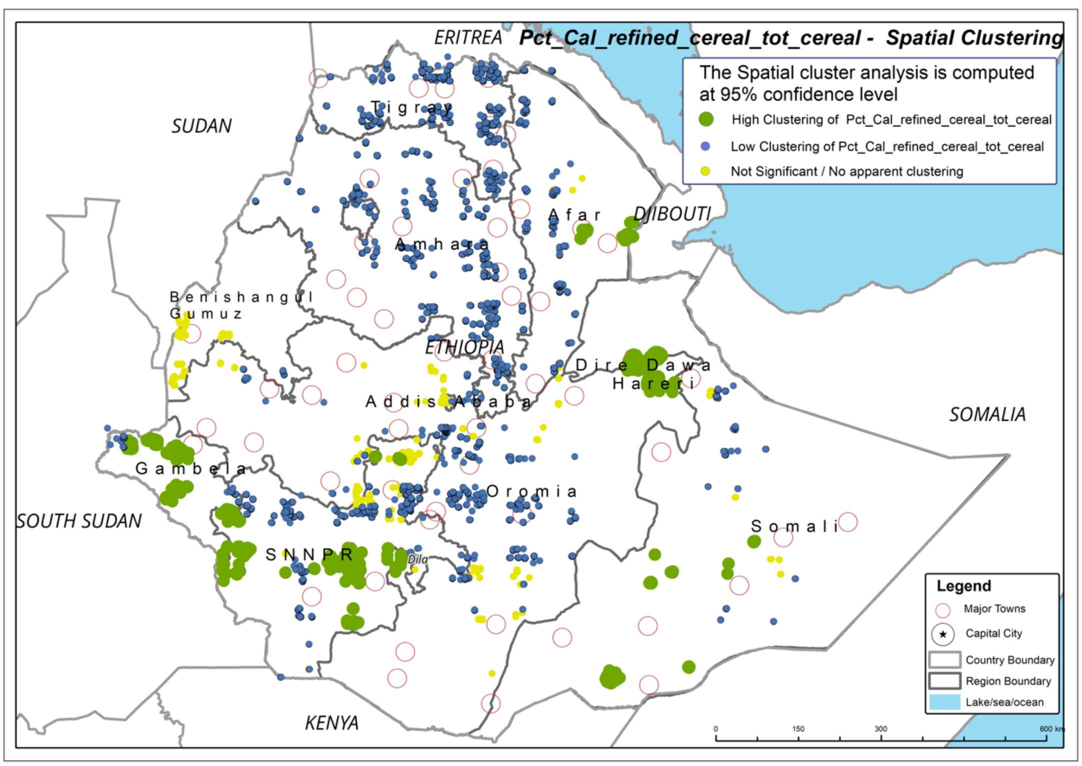


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FIGURE 5.10: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF PERCENTAGE OF REFINED CEREALS CALORIES OUT OF TOTAL CEREAL CALORIES

Source: Own calculation using HCES 2016

5.3.6 Determinants of calorie intake from refined cereals in urban Ethiopia

To identify the determinants of consumption of calories derived from refined cereals, three regression models are estimated. The first model is the logarithm of calories derived from refined cereals PAE per day. The Generalized Least Square (GLS) regression model estimates the coefficients of socio-economic and demographic characteristics of the households, where the outcome is log transformed total calorie derived from refined cereals,

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As indicated in sub-section 4.5.5 (in Chapter 4), GLS regression is applied (against pooled Ordinary Least Square-OLS), to manage the problem of heteroskedasticity that is frequently encountered in cross-sectional data or with panel data having large cross-section dimensions. The GLS can produce estimates that are unbiased, consistent, efficient, and asymptotically normal (Cameron & Trivedi 2005). The outcome variable for the second model was the percentage of calories derived from refined cereals out of the total net calories consumed while the third model fitted calories derived from refined cereals consumed out of the total cereal consumption. The explanatory variables included in the models are the characteristics of the household head (gender, age, marital status, education, and sector of occupation), the characteristics of the household (the mean age of the household members, the adult equivalent of the household members, the income[5]), and the location of the household.

The parameter estimates and the t-statistics obtained from the GLS regression are presented in Table 5.7. In urban Ethiopia, being a male-headed household, heads have statistically significant negative effects on the consumption of calories derived from refined cereals PAE per day, signifying that male-headed households, on average, consumed 40%[6] less than households headed by females. Similarly, the percentages of calories from refined cereals (out of the total net calories) were also

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[5] Measured by quintile of the household according to the expenditure per adult equivalent.

[6] Calculated using the formula: $(e^{-0.508} - 1) \times 100\%$.

significantly lower than those of female-headed households. Adult equivalents of the household members turned out to have a significantly positive relationship with the calories consumed arising from refined cereals for the household members. For every one-unit increase in adult equivalent, the calories derived from the refined cereals' PAE increases by about 14%, with $p < 0.001$.

Households headed by younger individuals below 30 years of age, had lower calorie intakes from refined cereals compared to households headed by those in the age ranges of 31- to 50-years and above 50 years of age, respectively. This indicates that households headed by older individuals, on average, consume larger amounts of refined cereals (in absolute terms). However, the third model in Table 5.8 suggests that the percentage of calories derived from refined cereals out of the total cereal calories among households headed by middle and older-aged heads were 1.4% and 3.9% lower than the younger age groups, respectively. This implies that households that had younger heads, compared to those with older heads, tend to consume fewer overall calories (in absolute terms), but the contributions of refined cereals were relatively larger. The coefficients for the mean age of the household members also suggested an overall negative relationship with total calories and the share of calories from refined cereals. For every one-unit increase in the mean age of the household members, calories derived from refined cereals decreases by about 2.5%. Households that were dominantly younger tended to secure relatively higher proportions of their calories from refined cereals compared to households that had a higher mean age.

Education of the household head has a positive effect on the total calories derived from refined cereals. As the education level of the household head increased the consumption of refined cereals tended to increase as well. Compared to households headed by those without any formal education, those who had primary, secondary, and tertiary education tend to get 65%, 147%, and 204% more calories from refined cereals, respectively. The model results also showed that households headed by tertiary graduates consumed more refined cereals compared to those who did not have any formal education.

The total net calories derived from refined cereals were associated positively with the household size measured in adult equivalents. For every one-unit increment in adult equivalent, the contribution of refined cereals to overall dietary energy intake and calorie from cereal increased by 0.57% and 0.14%, respectively. This implies that consumption of refined cereals could increase if the household size increases.

The urban centres covered in the surveys were categorised into four zones[7]. All the locations were statistically significant and positive, suggesting that the consumption of refined cereal was heterogenous in various parts of the country. The average consumption of refined cereals was relatively lower in the Northern towns (comprising towns in Afar, Amhara and Tigray), which was set as the reference group. Eastern towns include Diredawa, Harar and towns in the Somali region, had the highest calorie intake from refined cereals. The households of those towns, on average, consumed 1456% more calories derived from refined cereals compared to the reference category (Northern towns). The share of calories from refined cereals out of the total cereal calories in Eastern towns, accounted for 30% more than the reference group. This was not surprising since the Eastern towns were predominantly reliant on imported foods because local grains were not growing well due to the climate conditions and the dominantly pastoralist livelihoods of the area.

The residents of Addis Ababa also obtained 359% more calories from refined cereals compared to residents in the reference towns, while the share of refined cereals of all the cereals exceeded by 13% compared to the Northern towns. Towns in Central, Southern and Southwestern Ethiopia consume slightly higher calories from refined cereals compared to Northern Ethiopia.

[7] Towns in Afar, Amhara, Beneshangul Gumuz, and Tigray are regarded as Northern towns. The urban centers located Gambella, Oromiya, and SNNP regions are put under the Central, Southern, and Southwestern category. Towns located in Somali region and Harari and Diredawa are Eastern clustered as Eastern Ethiopia towns.

The regression estimates clearly suggest that the quintile expenditure, a proxy for the household standard of living, is a significant predicator of the consumption of refined cereals. The average calorie intake from refined cereals, tends to increase progressively when moving from the poorest quintile (Q1) to the richest quintile (Q5), which implies that the total calorie intake from refined cereals increases with an increase in the standard of living. Similarly, the share of calories from refined cereals out of the total cereal calories follows a similar pattern with an increase in the standard of living. For example, compared to the poorest quintile (the reference group), the share of calories from refined cereals out of the calories from the total cereal is 9.4% higher for households in the richest quintile (Q5). On the other hand, the share of calories from refined cereals out of the total calories, tended to increase as one moves from quintile 1 to 4 and decreases for households in the fifth quintile. Compared to the poorest quintile (Q1), the calorie shares from refined cereals (out of the total calories) were 3.1% higher for households in the fourth quintile, while it was only 2.5% higher for the richest quintile (Q5). This clearly implies that the richest quintile, although getting higher calories from refined cereals (in absolute calories and the calorie share out of total cereals), its share out of the total dietary calories, tended to decrease compared to the households in the third and fourth quintile because of the shift to other non-cereal sourced calories.

One of the socio-economic variables, marital status, had a statistically significant effect in determining the consumption of refined cereals. Households managed by married heads derive more calories from refined cereals compared to the reference category, never married. This may be attributable to the regular meal pattern and social interaction that increased dietary consumption among households with a married head of household. On the other hand, households that headed by a person who had never married obtained a larger share of calories from refined cereals even when compared to the other categories. Table 5.7 shows that households headed by married and divorced/separated/widowed on the average derive 7.8% and 5.9% fewer calories (out of the total cereal calories), respectively. This signifies that households managed by never married heads, tended to consume relatively fewer overall cereal calories, but they still had a relatively larger share of the cereal calories derived from refined cereals. Never married households relied more on sources of food other than cereals as compared to the other marital categories.

TABLE 5.7: GENERALISED LEAST SQUARE (GLS) REGRESSION RESULTS OF DETERMINANTS OF REFINED CEREALS CONSUMPTION IN URBAN ETHIOPIA

INDEPENDENT VARIABLES	MODEL (1) LOG OF CALORIES FROM REFINED CEREALS PAE/PER DAY	MODEL (2) % OF CALORIES FROM REFINED CEREALS (OUT OF TOTAL NET CALORIES)	MODEL (3) % OF CALORIES FROM REFINED CEREALS (OUT OF CEREAL CALORIES)
Male	-0.508***(-14.00)	-0.732***(-6.23)	4.174***(16.23)
Age of the household head			
Below 30 (Ref)	[Ref.]	[Ref.]	[Ref.]
31 to 50	0.112**(3.00)	-0.206 (-1.71)	-1.378***(-5.24)
51 and above	0.151**(2.61)	-0.910***(-4.88)	-3.885***(-9.62)
Marital status			
Never married (Ref)	[Ref.]	[Ref.]	[Ref.]
Married	0.881***(20.37)	1.278***(9.12)	-7.809***(-24.96)
Divorced/Separated/Widowed	0.524***(9.98)	0.134 (0.79)	-5.883***(-15.71)
Education category			
No formal education (Ref)	[Ref.]	[Ref.]	[Ref.]
Primary school	0.500***(12.35)	-0.0509(-0.39)	-0.169(-0.60)
Secondary school	0.905***(22.83)	0.748***(5.83)	1.211***(4.36)
Tertiary level	1.113***(22.76)	1.828***(11.54)	4.299***(12.49)
Employment sector			
Informal sector (Ref)	[Ref.]	[Ref.]	[Ref.]
Formal (Private)	0.150***(4.37)	0.0437(0.39)	-0.815***(-3.36)
Public and NGO	0.136**(3.22)	-1.119***(-8.17)	-4.538***(-15.22)
Other	0.260***(6.93)	0.509***(4.19)	-0.789**(-2.99)
Mean age	-0.0257***(-14.57)	-0.0531***(-9.30)	-0.00219(-0.18)
Adult equivalent	0.131***(14.22)	0.586***(19.68)	0.135*(2.10)
Quintile (Exp PAE)			
Quintile 1 (Poorest) (Ref)	[Ref.]	[Ref.]	[Ref.]
Quintile 2	0.972***(22.77)	1.712***(12.38)	2.592***(8.70)
Quintile 3	1.539*** (35.40)	2.601***(18.48)	4.470***(14.72)
Quintile 4	1.941*** (43.24)	3.140***(21.59)	6.511***(20.70)
Quintile 5 (Richest)	2.054*** (42.51)	2.527***(16.15)	9.370***(27.56)
Zone			
Northern towns (Ref)	[Ref.]	[Ref.]	[Ref.]
Central_S_SW towns	0.361***(11.14)	0.344**(3.28)	2.551***(11.14)
Eastern towns	2.745***(59.05)	15.98***(106.19)	28.99***(88.67)
Addis Ababa	1.524***(39.69)	3.248***(26.12)	7.674***(28.45)
_cons	0.564***(7.12)	3.391***(13.24)	12.73***(22.80)
N	54, 069	54, 069	52, 660

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using HCES 2000, 2005, 2011,2016

5.3.7 Blinder-Oaxaca decomposition of refined cereals consumption

In this sub-section, a two-fold Blinder-Oaxaca decomposition for linear models was applied to quantify the distribution differences of covariates in explaining the average differences of the calories from refined cereals in urban Ethiopia between 2000 and 2016. The results of the decomposition analysis examined how much of the gap could be explained by differences in observable characteristics (endowments) and how much is not explained (coefficient effects).

Table 5.9 shows the results of the aggregate decomposition (the top panel) and the detailed decomposition showing the contribution of individual covariates (the bottom panel). The predicted calorie intake derived from refined cereals increased from 141 Kcal/AE/per day in 2000 to 329 Kcal/AE/per day in 2016. The observed change was particularly smaller among households in the richest quintile (Q5), suggesting that the consumption of refined cereals did not exhibit substantial changes between the survey periods among the top 20 economically well-off households. From the aggregate decomposition of the entire sample population, the shift in the observed distribution of covariates included in the model could explain only 21% of the difference observed in the period between 2000 and 2016. The remaining 79% of the increase could be explained by factors other than the ones included in the model.

This means that the increment in consumption of factory-processed cereals like pasta, macaroni, and wheat flour over the period under consideration was largely due to changes in factors outside the household characteristics. The food environment in urban Ethiopia that changed the availability and use of these cereals over time was more likely to have explained the increased consumption rather than individual household socio-economic and demographic characteristics. Among others, the urban wheat subsidy programme introduced by the Government of Ethiopia in 2008 may have played a bigger role in changing the food environment. Since 2008, the government had procured copious amounts of wheat from the international market and sold these to flour mills at subsidised prices. The flour mills, in turn, sold the wheat flour to bakeries or consumers' cooperatives at fixed prices.

Among the observed variables in the model, changes in the real expenditure PAE were the most important driver of the increase in the consumption of refined cereals between 2000 and 2016. The shift in the economic wellbeing of households, measured by the real expenditure PAE, explained 19% of the total predicted change in the calorie PAE per day. The effect of the shift in economic wellbeing on the consumption of refined cereals was pronounced, particularly among households in the poorest quintile (Q1). An increase in the real expenditure PAE between the survey periods accounts for 65% of the increase among this group, signifying that the increase in economic wellbeing witnessed over a 16-year period helped the poorest quintile to boost its consumption of refined cereals.

The change in the composition of household heads' education was also another important driver of the increment in the consumption of refined cereals in urban Ethiopia. It explained some 10% of the change in the two survey periods. The change in the employment sector and age of the household heads contributed to 5% and 3% of the change, respectively. The negative signs of the coefficients clearly suggested that households' characteristics such as, the marital status and gender of the head, household size, and the percentage of household budget devoted to food, played a counteracting effect on the observed change.

TABLE 5.8: BLINDER-OAXACA DECOMPOSITION IN THE CALORIES FROM REFINED CEREALS IN URBAN ETHIOPIA BETWEEN 2000 AND 2016 (OVERALL AND BY QUINTILE EXPENDITURE) (OVERALL AND EXPLAINED COMPONENT)

	(1) All	(2) Quintile 1(Poorest)	(3) Quintile 2 (Poor)	(4) Quintile 3 (Medium)	(5) Quintile 4 (Rich)	(6) Quintile 5 (Richest)
group_1=2016	328.9*** (2.938)	208.1*** (5.046)	316.0*** (5.684)	363.7*** (6.511)	394.0*** (7.469)	354.8*** (7.241)
group_2=2000	141.0*** (1.988)	38.17*** (1.621)	79.14*** (2.521)	114.6*** (2.989)	167.8*** (3.942)	268.6*** (6.014)
difference	187.9*** (3.547)	169.9*** (5.300)	236.8*** (6.218)	249.1*** (7.164)	226.2*** (8.445)	86.27*** (9.413)
explained	39.57*** (3.420)	63.18*** (7.858)	30.82 (19.26)	62.89** (24.29)	70.77** (23.71)	37.87*** (8.850)
unexplained	148.3*** (4.410)	106.8*** (7.840)	206.0*** (19.92)	186.2*** (24.33)	155.4*** (23.32)	48.41*** (11.43)
explained						
Male	-1.719*** (0.500)	-1.014 (0.848)	-0.181 (0.851)	-2.035* (1.017)	-2.227* (0.956)	-1.939 (1.444)
Age	5.575*** (1.108)	0.178 (1.234)	4.205* (1.664)	2.815 (3.197)	10.38** (3.579)	1.330 (3.233)
real_exp_PAE	33.91*** (1.938)	110.3*** (5.686)	94.60*** (17.68)	115.4*** (23.72)	86.16*** (22.52)	25.78*** (5.427)
Age_mean	-0.220 (0.186)	-0.881 (0.615)	-0.563 (0.628)	-1.664 (0.978)	-0.420 (0.524)	-0.543 (0.626)
hh_size	-12.12*** (1.221)	-14.60*** (2.186)	-33.63*** (3.790)	-29.94*** (3.731)	-20.98*** (3.730)	-7.123* (3.439)
educ	18.63*** (2.494)	-3.460 (4.828)	-3.602 (5.660)	-4.202 (5.053)	-3.403 (6.414)	7.627 (4.767)
emp	8.581*** (2.085)	1.753 (3.181)	-0.415 (4.079)	5.450 (3.999)	22.67*** (5.176)	14.20** (5.140)
marit	-3.406** (1.047)	2.021 (1.218)	-1.154 (1.342)	-0.886 (2.297)	-9.679** (2.975)	-3.446 (3.116)
pct_food_exp	-9.665*** (0.808)	-31.08*** (2.707)	-28.44*** (2.662)	-22.06*** (2.531)	-11.72*** (2.003)	1.984 (1.410)
N	28460	5245	5558	5828	5890	5938

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: the explanatory variables are Male (male headed households), Age (Age of the household head), real_exp_PAE (real expenditure per adult equivalent), Age_mean (mean ae of the household), hh_size (household size), educ (level of education of the household head), emp (employment of the household head), marit (marital status of the household head), pct_food_exp (percentage share of expenditure on food).

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.4 PATTERNS AND DETERMINANTS OF ANIMAL SOURCE FOODS (ASF) CONSUMPTION IN URBAN ETHIOPIA

In this section, the patterns of change in the consumption of ASFs, is measured in terms of expenditure on animal source foods (Birr/AE/year), the actual quantities of ASF (kg/AE/year), and the number of calories derived from ASFs (calories/AE/year). The items included as ASF are beef, chicken, eggs, fish, milk, mutton and goat, offal, and other meats. The consumption of factory-processed milk powder is not included under this category as it falls more conveniently under the ultra-processed food category given the extent of processing it undergoes. Some studies classified honey under ASF because it is made by bees (For example, see Getachew, Hassen & Minten 2018). However, given it is made from floral nectar and its nutritional content is predominantly simple sugars (fructose, glucose, maltose, etc), for the sake of this study it is classified under sugars. Butter is another product obtained from animal sources (for example, cow's milk) but for the sake of this study, it is classified under fats and oil primarily because of the nutritional content (saturated fat).

The analysis in this section presents and examines the patterns of change, the spatial clustering of ASF consumption, determinants, and the drivers of change between 2000 and 2016.

5.4.1 Patterns of change of animal source foods (ASF) consumption

As presented in Table 5.10, households' annual expenditure on ASF increased from 923 Birr PAE in 2000 to 1,330 Birr PAE in 2016 (both in 2016 price terms). This implies that households in urban Ethiopia, on average spent 44% more money on ASF than in the last 16 years. Compared to the 51% real expenditure, the PAE growth recorded during the same period, the corresponding growth in ASF expenditure was smaller. This means that the pace of change in ASF expenditure was relatively slower than the pace of change in the total expenditure of the households.

The expenditure on ASF, which remained around 13% of the household food budget in the three survey years between 2000 and 2011, grew to 16% in 2016. Beef represented around half of the household budget spent on ASF in 2000 and 2005 but dropped to 45% and 43% in 2011 and 2016, respectively. Mutton/ goat was the second most important ASF in terms of the expenditure share of households in urban Ethiopia. Mutton/goat, which comprised 20% of the ASF expenditure in 2000, rose to 28% in 2016. This implies that households were increasingly shifting a portion of their expenditure on beef to mutton/goat, albeit beef continued to dominate, in terms of the expenditure share. Households in urban Ethiopia spent between 13% to 17% of their ASF expenditure on milk during the survey years under consideration. However, there was no discernible trend in the expenditure share allocated to milk. The share of ASF expenditure on chicken remained around 8% in 2005, 2011, and 2016. The ASF expenditure share of eggs that remained at 4% in 2000, 2005, and 2011 rose to 6% in 2016.

The average quantities of ASF consumed in urban Ethiopia grew from 17kg/PAE/year in 2000 to 25kg/PAE/year in 2016, an increase of 47% over a 16-year period, slightly above the 44% growth registered in ASF expenditure during the same period. Under the circumstances, that there was no significant shift in the expenditure patterns of households on different ASF between 2000 and 2016, this is an indication that the prices of ASF have increased at a relatively identical pace, compared to other foods, even after controlling for food inflation.

The average consumption of beef, which stood at 5kg/AE/year in 2000, rose to 8kg in 2016. During the same period, the average consumption of milk increased by 25%, from 8kg/AE/year to 10 kg/AE/year. A relatively fast pace of increase was observed in the consumption of mutton/goat, which surged progressively from 2kg/AE/year in 2000 to 5kg/AE/year in 2016, an increase of 150%. Standing between 0 to 1kg/AE/year, the consumption of chicken and eggs did not show much progress during the 16-year period. Fish, offal, and other meats are insignificant in the dietary consumption of urban Ethiopia. The contribution of ASF to the overall dietary energy intake did not show progress over the period under consideration. The share of ASF calories remained at 2% of the dietary energy intake in urban Ethiopia.

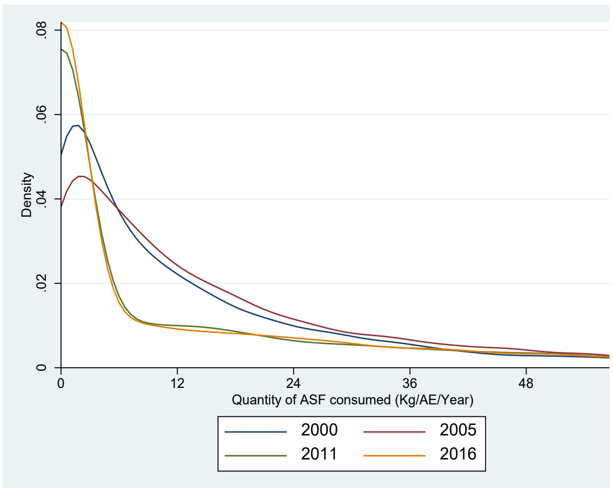

FIGURE 5.11a: DENSITY CURVES DEPICTING THE EVOLUTION OF QUANTITIES OF ASF CONSUMED (KG/AE/YEAR)

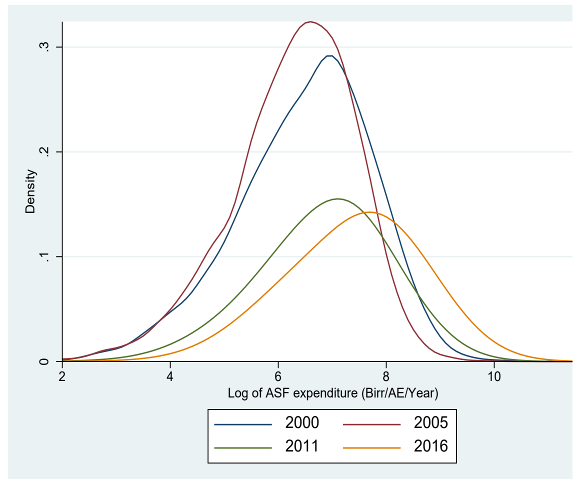

FIGURE 5.11b: DENSITY CURVES DEPICTING THE EVOLUTION OF LOG OF REAL EXPENDITURE ON ASF (BIRR/AE/YEAR)

Source: Own calculation using HCES 2000, 2005, 2011, and 2016

5.4.2 Consumption of animal source foods (ASF) by quintiles expenditure

Table 5.10 compares the household level ASF expenditure PAE/year differential and quantities consumed PAE/year of ASF across expenditure PAE quintiles, based on the 2016 HCES. ASF constituted around 3.8% of household food expenditure of the poorest quintile, while the richest quintile allocated around 21% of its household food budget on ASF. Household expenditure PAE/year on ASF, increased progressively from the poorest quintile (Q1) to the richest quintile (Q5). On average, households of the poorest quintile (Q1) in urban Ethiopia spent just 133 Birr/ AE/year on ASF versus 3,610 Birr/AE/year among households in the richest quintile (Q5) (both in 2016 prices). Thus, the richest quintile, on average spent, 27 times more than the poorest quintile. ASF expenditure PAE of the richest quintile (Q5) stood 113% higher than the fourth quintile and 785% higher than the third quintile. Unlike the expenditure PAE of starchy staples, which show relatively little variability across quintiles, the discrepancy of ASF expenditure PAE across quintiles is too large.

The relatively large discrepancy of ASF expenditure across quintiles is further translated into a relatively large gap in terms of quantities of ASF consumed. The poorest quintile households in urban Ethiopia consumed 5kg of ASF while the average consumption of the richest quintile (Q5) stood at 55kg PAE per year. The richest quintile, on average, consumed 1000%, 358%, 206%, and 67% larger quantities of ASF as compared to the poorest, second poorest (Q2), middle (Q3), and second richest (Q4) quintiles, respectively. The difference between the expenditure PAE and the quantities PAE across quintiles is quite substantial, implying that the richest quintiles spend much of their household food budget on high-valued ASF while the poorer households spend their limited household budget on relatively cheaper ASF.

Beef constituted the largest share of the households' expenditure on ASF in all quintiles except that of the poorest quintile. Households in the poorest quintile (Q1) spent 57 Birr/year on milk and 43 Birr PAE per year on beef, which constituted around 2% and 1% of their overall food budget, respectively. Milk was the second most important ASF after beef in terms of expenditure PAE per year for the second and the third quintiles. The budget allocated to mutton and goat meat and milk comprised the second and third highest ASF for households in the fourth and fifth quintiles. For the fifth quintile, beef represented around 9% of the household food budget, while mutton and goat accounted for 7% of the food expenditure. The corresponding budget spent on the two animal-source foods, merely comprised 2% and 5% of the food budget of households in the medium quintile (Q3).

Overall, the PAE consumption of all ASF, except that of fish, increased consistently from quintile 1 to quintile 5, suggesting that the quantities of consumed ASF were positively correlated with the level of income, as proxied by the expenditure PAE. Fish consumption was exceptionally low among the poor and rich households in urban Ethiopia. Fish represented only 0.1% of the food expenditure of all quintiles in urban

Ethiopia. The bottom 40% of the households in urban Ethiopia consumed slightly larger amounts of fish compared to the richer quintiles (0.2kg/PAE/year versus`0.1kg/PAE/year).

TABLE 5.9: CONSUMPTION OF ASF BY EXPENDITURE PAE AND SHARE, QUANTITIES AND CALORIE CONTRIBUTION, 2000, 2005, 2011 AND 2016

ANIMAL SOURCE FOOD	BIRR/AE/YEAR (ADJUSTED TO 2016 PRICE)								KG/AE/YEAR				CALORIE/AE/DAY							
	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% SHARE	2000	2005	2011	2016	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% SHARE
Beef	484	7%	400	7%	328	6%	587	7%	5	7	6	8	13	1%	18	1%	17	1%	22	1%
Chicken	40	1%	61	1%	58	1%	114	1%	1	1	1	1	2	0%	2	0%	2	0%	1	0%
Egg	33	0%	30	1%	27	0%	75	1%	0	0	1	1	0	0%	0	0%	3	0%	0	0%
Fish	7	0%	3	0%	4	0%	6	0%	0	0	0	0	0	0%	0	0%	1	0%	1	0%
Milk	158	2%	95	2%	107	2%	184	2%	8	7	10	10	16	0%	14	1%	22	1%	23	1%
Mutton/goat	188	3%	164	3%	198	3%	373	4%	2	3	4	5	4	1%	6	0%	8	0%	9	0%
Offal	0	0%	0	0%	4	0%	7	0%	0	0	0	0	0	0%	0	0%	0	0%	0	0%
Other meats	7	0%	3	0%	4	0%	9	0%	0	0	0	0	0	0%	0	0%	0	0%	1	0%
Total	**918**	**13%**	**757**	**13%**	**729**	**13%**	**1355**	**16%**	17	19	23	25	**35**	**2%**	**40**	**2%**	**53**	**2%**	**57**	**2%**

Source: Own calculation using HCES 2000, 2005, 2011, 2016

TABLE 5.10: HOUSEHOLD EXPENDITURE PAE AND QUANTITIES OF ANIMAL SOURCE FOOD BY EXPENDITURE QUINTILE (2016)

ANIMAL SOURCE FOOD	Q 1		Q2		Q3		Q4		Q5		KG/AE/YEAR				
	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	Q1	Q2	Q3	Q4	Q5
Beef	43	1.2%	172	3.0%	397	5.2%	765	7.3%	1,461	8.8%	1	3.1	5.8	10.6	17.2
Chicken	5	0.1%	31	0.5%	69	0.9%	143	1.4%	303	1.8%	0	0.4	0.7	1.1	2.2
Egg	6	0.2%	24	0.4%	45	0.6%	99	0.9%	189	1.1%	0.1	0.5	0.9	1.8	3.3
Fish	4	0.1%	4	0.1%	4	0.1%	6	0.1%	13	0.1%	0.2	0.2	0.1	0.1	0.1
Milk	57	1.6%	109	1.9%	145	1.9%	244	2.3%	340	2.0%	3.7	7.1	8.8	13.6	17.5
Mutton and goat	12	0.3%	59	1.0%	145	1.9%	394	3.8%	1,210	7.3%	0.1	0.7	1.8	4.9	13.9
Offal	1	0.0%	3	0.1%	5	0.1%	8	0.1%	18	0.1%	0	0.1	0.1	0.1	0.3
Other meats	3	0.1%	4	0.1%	6	0.1%	9	0.1%	21	0.1%	0	0.1	0.1	0.1	0.2
Total	**131**	**3.8%**	**405**	**7.1%**	**816**	**10.7%**	**1,668**	**16.0%**	**3,554**	**21.4%**	**5**	**12**	**18**	**33**	**55**

Source: Own calculation using HCES 2016

5.4.3 Hot spot spatial analysis of animal source foods (ASF) consumption

The spatial analysis results presented in Figure 5.12 shows areas with high and low clustering of ASF consumption as measured by quantities of ASF (Kg/AE). The major hot spots were found in Northern and Central Tigray, around Gondar town (Amhara), in Addis Ababa and nearby towns, Diredawa, Harari, Dilla and Wolayita, around Mizan Teferi (SNNP), around Dolo Ado area (Somali), around Assossa town and nearby Wolega areas. The cold spot areas where there is significant clustering of the low consumption of ASF are located around Western Tigray, Eastern Amhara, Afar, Central Oromiya, Northern and Central SNNP, and Northeast Somali.

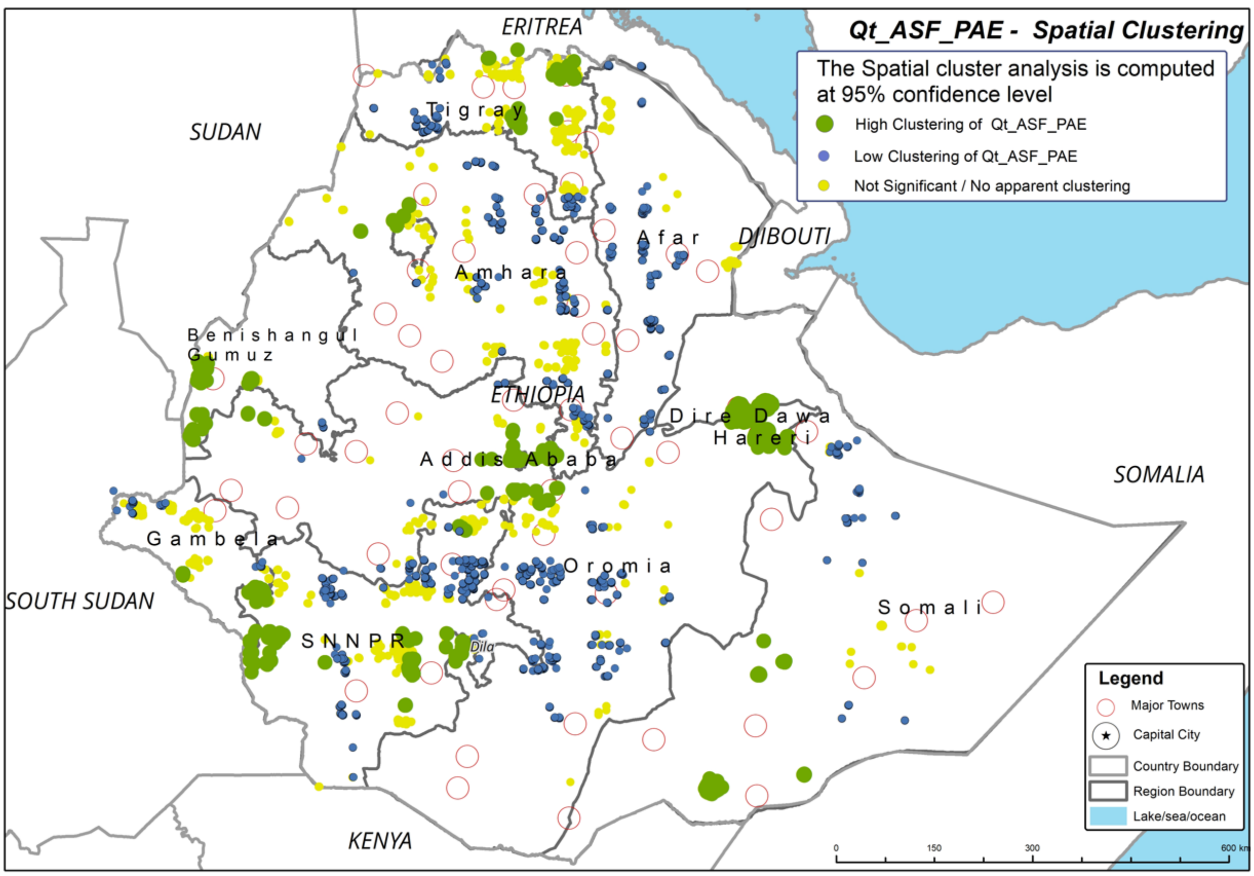

FIGURE 5.12: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF QUANTITIES OF ASF PAE CONSUMED

Source: Own calculation using HCES 2016

5.4.4 Determinants of ASF consumption in urban Ethiopia

Table 5.11 presents the results of the two models estimated to identify the determinants of ASF consumption using Generalised Least Square (GLS) regression for the pooled four round survey data in 2000, 2005, 2011, and 2016. The first result estimates the determinants of the quantities of ASF consumed while the second model presents the estimated results for the percentage share of ASF expenditure out of the total food expenditure. The ASF included in the models are beef, chicken, eggs, fish, milk, mutton and goat, offal, and other meats. The total quantity of these items consumed by the households in each year was divided by the corresponding adult equivalent values to obtain the total quantity of ASF per adult equivalent per year. To construct the dependent variable for the second model, the total annual expenditure of the households on these ASF items are aggregated and divided for the corresponding adult equivalent.

The coefficients of the GLS regression suggest that male-headed households consume 3.8kg lower quantity of ASF and spend 1.3% lesser share of their food expenditure on ASF compared to the female-headed counterparts. This may suggest that households that have women as key decision-makers on purchases, preparation, and consumption at household level, tend to spend a better share of their household food budget on ASF. On the other hand, households that have men as key decision-makers may spend a lower proportion of their food budget on ASF and, consequently, the household members consume lower quantities of ASF.

The regression coefficients suggest that the age of the head has a significant effect on the quantity of ASF consumed and the budget share households allocate for ASF. Compared to households headed by younger ages (30 and under), households that have middle-aged heads (31 to 50 years) on the average tend to consume 2.9kg/AE/year more ASF and spend 1.6% more of their food budget share on ASF, holding other variables constant. The average ASF consumption is even larger for households headed by older ages (above 50), where these households, on average, consume 5.2kg/AE/year more ASF and allocate 3% more on the food budget compared to the reference group, thirty and below years. The results appear to suggest that older heads tended to provide more ASF for the consumption of their household members. The coefficients and t-statistics results suggested that for every one-year increment in mean age of the household, the average quantity of ASF consumed decreased by 0.28kg/AE/year, and the average annual ASF food expenditure share decreased by 0.09%. This result seems to suggest that households composed of younger age members have a lower likelihood of consuming ASF, while households with older average ages tended to consume more ASF and spend a larger share of their food budget on ASF.

It appears that the marital status of the head has a significant effect on a household's consumption of ASF as is clearly evidenced by the regression result. Compared to households headed by never married, households that had married couples consumed 17.8kg/AE/year more ASF, and their food share expenditure on ASF was about 6.2% more. This may be because marital life may have an easier social and physical environment to consume more ASF. The average consumption of ASF for households that have divorced/ separated/widowed heads is 10 kg/AE/year higher than those headed by those that never married. The former also spent 3% more food expenditure share on ASF compared to the reference groups (never married).

The magnitudes of the coefficients and the t-statistics consistently suggested that the income level, as proxied by the expenditure PAE quintile, was a strong predictor of the consumption and the food budget share of ASF. Notable differences were observed between different quintiles in terms of ASF consumption and budget share spent on ASF. Keeping other variables constant, compared to the poorest quintile (reference), Q2, Q3, Q4, and Q5, consumed 8.1kg, 16.3kg, 26.9kg, and 44.4kg more ASF PAE per year, respectively. These results strongly suggested that people in urban Ethiopia tended to consume more ASF as the households became richer. Similarly, the share of the food budget spent on ASF consistently increased as we moved from the poorest to the richest quintile, suggesting that ASF were the diets preferred and consumed by the rich, while the poor households tended to allocate their tighter budget on cheaper dietary energy sources instead of on pricey ASF.

The consumption of ASF also had a spatial dimension that showed marked difference among urban settings in various parts of Ethiopia. The GLS regression model suggests that towns in Eastern Ethiopia had larger quantities of ASF consumption. The average quantities of ASF consumed in Eastern Ethiopia towns is 15.1kg/PAE/per year more than the reference group, the Northern Ethiopian towns. The relative preponderance of ASF in Eastern Ethiopian towns is largely connected to the more extensive consumption of milk rather than meat and other ASF, since the urban population has easy access to the pastoral community.

Towns in Central, South and Southwest Ethiopia also have 2.8kg/AE/year more ASF consumption compared to the reference group. On the other hand, the coefficients for the second indicator, the percentage share of food expenditure on ASF, suggest that Northern towns had a relatively higher proportion of their household food budget devoted to ASF. This may be because of the dominant types of ASF consumed in various parts of the country that had widely different prices. As suggested by the HCES data (data not shown here) the dominant type of ASF consumed in Norther Ethiopia was meat, while the diet in Eastern Ethiopia was dominated by the consumption of milk. The price of a kilogram of meat (beef, goat, mutton, etc) was much higher than that of milk (cow, goat, camel). This may lead to Northern towns spending a relatively higher proportion of the household food budget on ASF, but smaller quantities of ASF compared to the other zones including Eastern Ethiopia.

TABLE 5.11: GLS RESULT: DETERMINANTS OF QUANTITIES OF ASF CONSUMED AND PERCENTAGE SHARE OF EXPENDITURE ON ASF

INDEPENDENT VARIABLES	MODEL (1) ANIMAL SOURCE FOOD (KG/ PAE /YEAR)	MODEL (2) PERCENTAGE OF FOOD EXPENDITURE ON ANIMAL SOURCE FOODS
Male	-3.847***(-6.80)	-1.379***(-9.72)
Age		
30 and below (Ref)	[Ref.]	[Ref.]
31 to 50	2.932***(5.04)	1.640***(11.22)
51 and above	5.185***(5.77)	2.952***(13.09)
Marital status		
Never married (Ref)	[Ref.]	[Ref.]
Married	17.82***(26.41)	6.168***(36.42)

INDEPENDENT VARIABLES	MODEL (1) ANIMAL SOURCE FOOD (KG/ PAE /YEAR)	MODEL (2) PERCENTAGE OF FOOD EXPENDITURE ON ANIMAL SOURCE FOODS
Divorced/ Separated/ Widowed	10.07***(12.29)	3.740***(18.19)
Education category		
No formal education (Ref)	[Ref.]	[Ref.]
Primary school	-3.213***(-5.09)	0.0185(0.12)
Secondary school	1.306*(2.11)	1.828***(11.79)
Tertiary level	8.149***(10.68)	2.997***(15.65)
Employment sector		
Informal sector (Ref)	[Ref.]	[Ref.]
Formal (Private)	-3.253***(-6.07)	-0.530***(-3.94)
Public and NGO	-5.113***(-7.76)	-0.0261(-0.16)
Other	0.299(0.51)	0.475**(3.23)
Mean age	-0.284***(-10.34)	-0.0877***(-12.71)
Adult equivalent	2.038***(14.22)	1.581***(43.94)
Quintile (Exp PAE)		
Quintile 1 (Poorest) (Ref)	[Ref.]	[Ref.]
Quintile 2	8.099***(12.17)	3.827***(22.91)
Quintile 3	16.34***(24.12)	7.108***(41.79)
Quintile 4	26.89***(38.41)	10.64***(60.54)
Quintile 5 (Richest)	44.38***(58.92)	13.90***(73.49)
Zone		
Northern towns (Ref)	[Ref.]	[Ref.]
Central_S_SW towns	2.774***(5.49)	-0.706***(-5.56)
Eastern towns	15.19***(20.96)	-0.224(-1.23)
Addis Ababa	-0.943(-1.58)	-0.792***(-5.27)
_cons	-11.01***(-8.92)	-5.949***(-19.21)
N	54069	54069

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.4.5 Blinder-Oaxaca decomposition position of ASF consumption

Table 5.12 presents the overall Blinder-Oaxaca decomposition results on the top panel and details showing the contribution of an individual covariate for the change in the consumption of ASF between 2000 and 2016 at the bottom panel. The first column of the table presents the decomposition of the full population of the two surveys. To explore whether particular patterns of evolutions are taking place in the quantity of ASF consumed among households in different income levels over the survey periods, separate decompositions were run and presented for each expenditure PAE quintile group. From the aggregate decomposition, the covariates in the model explained about 96% of the change in the consumption of ASF in urban Ethiopia between 2000 and 2016. The proportion of difference explained by the covariates was more than 100% among households in the second to fourth quintiles, suggesting that the changes in the consumption of ASF were overexplained by the change in covariates, the actual consumption increased by smaller quantities than what would be expected based on the change in covariates.

The Blinder-Oaxaca decomposition suggests that the change in real expenditure PAE, a proxy of household real income, represented around 148% of the observed increase in the total quantities of ASF consumed from 18.8kg/AE/year in 2000 to 25kg/AE/year in 2016. This means the change in quantities of ASF over a 16-year period was overexplained by the increase in real expenditure PAE. The actual consumption of ASF had increased only by 6.61kg PAE over the two survey years, which was lower than what would be expected by the change in expenditure PAE due to the accelerated increment in the economic status of households. The magnitude of change in the consumption of ASF due to the real expenditure PAE, was particularly large among households in the second to fourth quintiles, while the change due to the income factor (as proxied by real expenditure PAE) was relatively small in the upper and lower end quintiles (Q5 and Q1). This implies that the change in real expenditure PAE had relatively little influence on changing the consumption of ASF among the poorest and the richest quintiles.

The second most important driver of the change in the quantities of ASF PAE consumed between the survey years was the household head's education level. It accounted for about the 48% of the predicted increment in the quantity of ASF consumption between 2000 and 2016. The change in this covariate explained the statistically significant change in ASF consumption among households in the richest quintiles (Q5), implying the role of education in changing the ASF consumption pattern among the economically well-off households.

The decomposition coefficients indicated that the shift in the percentage of the household budget spent on food and the household size explained a significant negative effect on the consumption of ASF, suggesting that the covariates had a counteracting effect on the observed change over the past 16-year period. In addition, the observed characteristics, such as the age of the household head, the gender, and the mean age of the household, had the opposite effect in explaining the change, but the magnitudes were rather exceedingly small.

TABLE 5.11: BLINDER-OAXACA DECOMPOSITION OF QUANTITIES OF ASF CONSUMED BETWEEN 2000 AND 2016 BY EXPENDITURE PAE QUINTILE (OVERALL AND EXPLAINED PORTION ONLY)

	(1) ALL	(2) QUINTILE 1 (POOREST)	(3) QUINTILE 2 (POOR)	(4) QUINTILE 3 (MEDIUM)	(5) QUINTILE 4 (RICH)	(6) QUINTILE 5 (RICHEST)
group_1=2016	24.96*** (0.401)	7.315*** (0.379)	14.16*** (0.505)	21.04*** (0.685)	32.25*** (0.871)	48.92*** (1.429)
group_2=2000	18.80*** (0.335)	4.647*** (0.284)	8.796*** (0.413)	14.31*** (0.587)	21.77*** (0.646)	39.08*** (1.029)
difference	6.166*** (0.522)	2.668*** (0.473)	5.368*** (0.652)	6.727*** (0.902)	10.48*** (1.084)	9.841*** (1.761)
explained	6.324*** (0.513)	0.521 (0.653)	5.555*** (1.562)	7.709** (2.483)	14.00*** (2.486)	10.37*** (1.879)
unexplained	-0.158 (0.620)	2.147** (0.708)	-0.187 (1.567)	-0.981 (2.648)	-3.519 (2.580)	-0.533 (2.012)
explained						
Male	-0.154*** (0.0465)	-0.0345 (0.0320)	-0.0136 (0.0640)	-0.0932 (0.0607)	-0.185* (0.0908)	-0.244 (0.183)
Age	-0.316* (0.132)	0.171 (0.0922)	-0.00351 (0.140)	-0.224 (0.318)	-1.352*** (0.391)	-2.887*** (0.664)
real_exp_PAE	9.120*** (0.452)	3.605*** (0.477)	12.07*** (1.520)	17.63*** (2.399)	22.81*** (2.368)	14.91*** (1.247)
Age_mean	-0.107** (0.0408)	-0.0611 (0.0400)	-0.177* (0.0827)	-0.174 (0.102)	-0.194 (0.201)	-0.240 (0.246)
hh_size	-1.657*** (0.155)	-1.000*** (0.164)	-2.808*** (0.288)	-4.246*** (0.462)	-4.704*** (0.487)	-4.065*** (0.728)
educ	3.012*** (0.338)	-0.431 (0.377)	0.181 (0.469)	-0.740 (0.575)	0.240 (0.696)	3.385*** (0.906)
emp	0.581* (0.283)	0.113 (0.258)	0.0768 (0.347)	0.337 (0.474)	1.969*** (0.527)	1.026 (0.950)
marit	-1.230*** (0.143)	0.00443 (0.0621)	-0.178 (0.105)	-0.460* (0.230)	-1.383*** (0.317)	-2.708*** (0.599)
pct_food_exp	-2.925*** (0.196)	-1.846*** (0.290)	-3.596*** (0.304)	-4.321*** (0.390)	-3.204*** (0.475)	1.194 (0.835)
N	28460	5245	5558	5828	5890	5938

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: the explanatory variables are Male (male headed households), Age (Age of the household head), real_exp_PAE (real expenditure per adult equivalent), Age_mean (mean ae of the household), hh_size (household size), educ (level of education of the household head), emp (employment of the household head), marit (marital status of the household head), pct_food_exp (percentage share of expenditure on food).

Source: Own calculation using HCES 2000 and 2016

5.5 PATTERNS AND DETERMINANTS REGARDING VEGETABLES AND FRUIT CONSUMPTION

This section discusses the patterns of change in the vegetable and fruit intake, the hotspot analysis illustrating the clustering of high and low consumption areas, their causes, and change drivers between 2000 and 2016.

5.5.1 Patterns of change of vegetables and fruits consumption

To assess the trends of consumption of fruit and vegetables in urban Ethiopia, the consumption expenditure PAE, annual quantities of fruits and vegetables consumed, and the number of calories derived from vegetables and fruit, were calculated. The values for the three indicators for all the survey years are presented in Table 5.13. Between 2000 and 2016, the real average household expenditure on vegetables rose from a mere 460 Birr/AE/year to 802 Birr/AE/year, an increase of 74% over a 16-year period. The real household budget allocated for vegetables that constituted around 7% in 2000, rose to 9% in 2016, primarily driven by the upsurge in the share of the food budget allocated to onions and tomatoes.

The change over time represents the increased role of vegetables not only in the absolute amount of the budget allocated that goes with income growth, but also the increased share of the household budget allocated to vegetables over the past 16 years. Although the budget allocated for vegetables tended to decrease in 2005 and 2011, this is because of the real prices of vegetables plummeted in these years, while the quantities consumed kept on growing. In 2000, the average quantities of vegetables consumed was standing at 32kg /AE/year, which rose to 39kg/AE/year in 2005 and in 56kg/AE/year 2011 and reached 76kg/PAE /year in 2016. Over the 16-year period, the quantities of vegetables consumed, increased by 138%, on average, implying the increasing rate of vegetable consumption in urban Ethiopia.

The most commonly consumed vegetables in urban Ethiopia are onions, tomatoes, and green leafy vegetables. Specifically, the consumption of onions and tomatoes exhibited a considerable upsurge between 2000 and 2016. The annual per adult equivalent quantities of onion consumed by households was around 9.2kg and increased progressively by more than three-fold and reached a staggering 30.1kg in 2016. Onions constituted between 43% to 55% of the overall household budget allocated to vegetables during the four survey years. The consumption of tomatoes also increased rapidly, which showed an increase of 357% within the same period from just 3kg/AE/year to 13kg/AE/year. The consumption of green leafy vegetables that included Ethiopian kale, cabbages, lettuce, and spinach was also growing, but at slower pace compared to onions and tomatoes. Between 2000 and 2016, the quantities of these green leafy vegetables grew by 55% from 15.5kg/AE/year to 24.1kg/AE/year. Although the quantities consumed were relatively small, the consumption of carrots (143%), garlic (375%), and other vegetables (57%) also increased within the 16-year period between 2000 and 2016.

Fruit constituted negligible proportions (below 1%) of the household food budget, albeit the share increased from less than 1% in 2000 and 2005 to just 1% in 2011 and 2016. This is a clear indication of the exceptionally low priority given to fruit among the households in urban Ethiopia. Bananas constituted the largest share of the household budget allocated to fruit, ranging between 33% to 45% of the budget allocated to fruit during the four survey years. The second most important fruits in terms of the household budget after bananas, are citrus fruits (oranges, mandarins, and lemons) representing around 23% to 42% of the household budget share allocated to fruits. The annual quantities of fruit consumed increased from 2kg/AE/year in 2000 to 5kg/AE/year in 2016. The intake of bananas, the most consumed fruit in urban Ethiopia, increased from 0.7kg/AE/year to 2.3kg/AE/year. The consumption of avocados and mangos showed an accelerated increase from an exceptionally low baseline (0.1kg/AE/year) in 2000 to 0.8kg/AE/year in 2016, suggesting that the two types of fruit have gained increased availability, accessibility, and acceptability in recent years.

As depicted in the Figure 5.13a, there has been a progressive shift to the right in the pattern of the overall distribution of quantities of vegetables and fruits consumed over the period under consideration (2000 to 2016), implying an overall improvement in the quantities of vegetables and fruits consumed in urban Ethiopia. However, the pattern of distribution of log of real expenditure on vegetables and fruit in Figure 5.13b suggest that the shift is not progressive according to the survey years. The distribution of the log of real vegetables and fruit expenditure/AE/year for 2005 and 2011 retreated to the left, when compared to the year 2000, signifying that the real expenditure on vegetables and fruit exhibited a contraction during these years. Although the distribution pattern of the two figures seems inharmonious, it may be because of the drop the real prices of these items in 2005 and 2011, which led households to the contraction of the amount of household budget allocated without reducing the quantity they purchased and consumed.

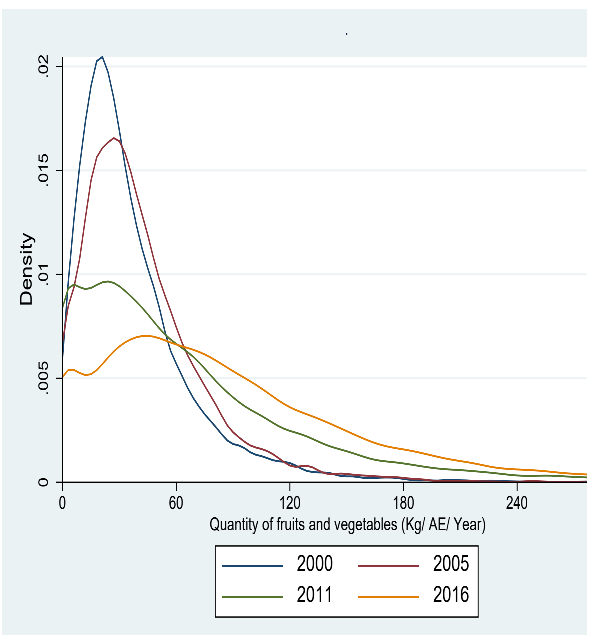

FIGURE 5.13a: DENSITY CURVE DEPICTING THE EVOLUTION OF QUANTITIES OF VEGETABLES AND FRUITS CONSUMED (KG/AE/YEAR)

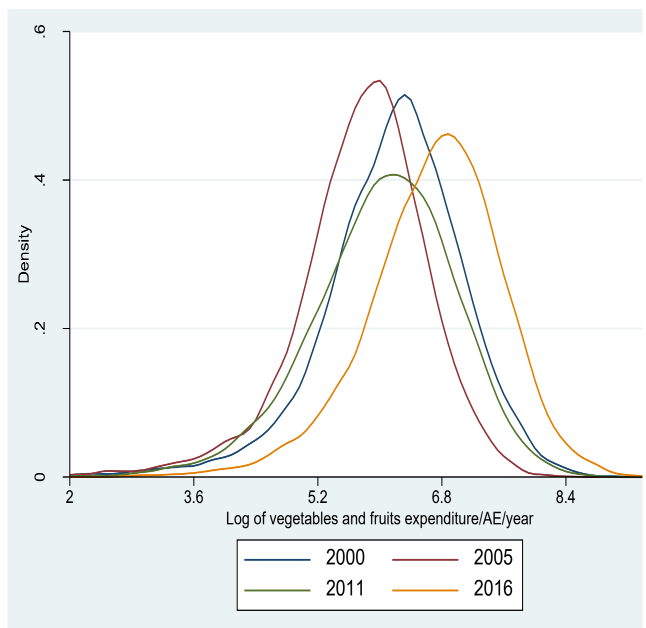

FIGURE 5.13b: DENSITY CURVE DEPICTING THE EVOLUTION OF REAL EXPENDITURE ON VEGETABLES AND FRUITS (BIRR/AE/YEAR)

Source: Own calculation using HCES 2000, 2005, 2011, and 2016

Overall, the quantities of vegetables and fruit consumed in urban Ethiopia registered a pronounced increase of 138% over the 16 years, albeit starting from an exceptionally low baseline in 2000, which coincided with the increased real income (as approximated by the increased real expenditure) registered during the same period. However, compared to the recommendation of 400 gram of vegetables and fruit/person/day, which may be translated into 146kg/person/year, the actual consumption in urban Ethiopia, reported at 81kg/AE/year in 2016, was exceptionally low.

5.5.2. Vegetables and fruits consumption by expenditure PAE quintiles

Based on the HCES data for the year 2016, the overall household expenditure PAE on vegetables and fruit increased consistently as we move from the poorest (Q1) to the richest quintile (Q5). Compared to the poorest quintile, households in the richest quintile spent approximately a 3.5 times bigger household budget on vegetables and more than 12 times for fruit. Regardless of the level of income, as proxied by expenditure PAE, the poor and the rich households in urban Ethiopia allocated approximately an equal portion of their food expenditure on vegetables. The budget share of vegetables constituted between 9% to 10% of the food expenditure among households in the first four quintiles, while it stood around 8% of the food budget share of the richest quintile. While the budget share allocated by the richest quintile was relatively smaller, the actual expenditure and the overall quantities of vegetables consumed were far larger because of the relatively larger food budget.

The actual quantities of vegetables such as, green leafy vegetables, were nearly equal across the quintile groups. The average quantities of green leafy vegetables consumed by all quintiles stood between 23 and 25kg/AE/year, suggesting that the consumption pattern of households in urban Ethiopia regarding green leafy vegetables was nearly uniform regardless of the economic status. The consumption of vegetables, such as carrots, garlic, and other vegetables was relatively small for households in all the quintiles, but slightly in favour of the richer households. The consumption pattern clearly suggests that there is a marked difference between the poorer and the richer households in terms of average quantities of onions and tomatoes consumed. For example, the poorest quintile was reported to have consumed 16kg/AE/year onions and 6kg/AE/year tomatoes, while the corresponding quantities for the richest quintile stood at 49kg/AE/year and 24kg/AE/year, respectively. This implies that the major source of difference between the rich and the poor quintiles in terms of actual quantities of vegetables consumed lay in two vegetables, onions, and tomatoes.

The annual expenditure PAE and the quantities PAE fruit consumed consistently increased with an increase in the expenditure PAE quintile from the poorest to the richest. Unlike vegetables, the percentage of household food budget share allocated for fruit consistently rose from the poorest to the richest quintile. The poorest quintile (Q1), on average, spent 0.5% of the food share, while the richest quintile (Q5) allocated 1.2% of the household food budget on fruit. A marked difference between the poorer and the richer quintiles was observed in terms of the quantities of citrus fruit (oranges, mandarins, and lemons), bananas, and mangos, while the difference in the quantities of avocado consumed was relatively minimal between the poorer and the richer quintiles.

TABLE 5.13: CONSUMPTION OF VEGETABLES AND FRUITS BY EXPENDITURE PAE AND SHARE, QUANTITIES, AND CALORIES CONTRIBUTION

	BIRR/AE/YEAR (ADJUSTED TO 2016 PRICE)								KG/AE/YEAR				CALORIES/AE/DAY							
	2000	**% SHARE**	**2005**	**% SHARE**	**2011**	**% SHARE**	**2016**	**% SHARE**	**2000**	**2005**	**2011**	**2016**	**2000**	**% SHARE**	**2005**	**% SHARE**	**2011**	**% SHARE**	**2016**	**% SHARE**
Green leafy vegetables	82	1%	46	1%	62	1%	118	1%	15.5	14.4	17.3	24.1	14	1%	9	0%	10	0%	14	1%
Onions	237	3%	183	3%	206	4%	347	4%	9.2	14.9	21.1	30.1	10	1%	24	1%	37	1%	52	2%
Other vegetables	46	1%	28	0%	47	1%	66	1%	3.0	2.6	5.4	4.7	3	0%	2	0%	5	0%	4	0%
Carrots	12	0%	6	0%	8	0%	15	0%	0.7	1.0	1.6	1.7	1	0%	1	0%	1	0%	1	0%
Garlic	23	0%	26	0%	44	1%	105	1%	0.4	1.0	1.1	1.9	1	0%	2	0%	3	0%	5	0%
Tomatoes	60	1%	41	1%	77	1%	151	2%	3.0	4.7	9.6	13.7	2	0%	3	0%	6	0%	9	0%
Vegetables total	460	7%	330	6%	443	8%	802	9%	32	39	56	76	32	2%	40	2%	62	2%	86	3%
Citrus fruit	11	0%	8	0%	8	0%	14	0%	0.6	0.7	0.9	0.7	1	0%	0	0%	1	0%	0	0%
Avocados	1	0%	2	0%	4	0%	8	0%	0.1	0.2	0.8	0.8	0	0%	0	0%	2	0%	2	0%
Bananas	10	0%	9	0%	12	0%	27	0%	0.7	0.9	2.2	2.3	1	0%	1	0%	3	0%	3	0%
Mangos	2	0%	6	0%	4	0%	8	0%	0.1	0.5	0.7	0.7	0	0%	0	0%	0	0%	1	0%
Papayas	2	0%	1	0%	1	0%	3	0%	0.2	0.1	0.2	0.2	0	0%	0	0%	0	0%	0	0%
Other Frui	5	0%	3	0%	8	0%	14	0%	0.2	1.4	0.6	0.6	0	0%	2	0%	1	0%	1	0%
Fruit total	31	0%	30	0%	37	1%	73	1%	2	3	5	5	3	0%	2	0%	6	0%	6	0%

	BIRR/AE/YEAR (ADJUSTED TO 2016 PRICE)								KG/AE/YEAR				CALORIES/AE/DAY							
	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% SHARE	2000	2005	2011	2016	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% SHARE
Total	**491**	**7%**	**360**	**6%**	**480**	**9%**	**875**	**10%**	**34**	**41**	**61**	**81**	**35**	**2 %**	**43**	**2 %**	**68**	**3 %**	**91**	**3 %**

Source: Own calculation using HCES 2000, 2005, 2011, 2016

TABLE 5.14: HOUSEHOLD EXPENDITURE PAE AND QUANTITIES OF VEGETABLES AND FRUITS BY EXPENDITURE QUINTILE (2016)

TYPE OF VEGETABLE / FRUITS	Q1		Q2		Q3		Q4		Q5		KG/AE/YEAR				
	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	BIRR/AE/ YEAR	% SHARE	Q1	Q2	Q3	Q4	Q5
Green leafy vegetables	90	2.2	109	1.6	121	1.4	136	1.1	161	0.9	23	24	25	24	25
Onions	178	4.3	290	4.3	361	4.0	466	3.9	607	3.3	16	27	32	39	49
Other vegetables	37	0.9	58	0.9	67	0.7	85	0.7	108	0.6	3	4	5	6	7
Carrots	4	0.1	10	0.2	16	0.2	26	0.2	33	0.2	0	1	2	3	3
Garlic	36	0.9	73	1.1	117	1.3	158	1.3	216	1.2	1	1	2	3	4
Tomatoes	55	1.3	121	1.8	167	1.9	218	1.8	286	1.6	6	12	15	19	24
Total Vegetables	**400**	**9.7**	**661**	9.8	**849**	9.4	**1088**	9.0	**1412**	7.7	**49**	**69**	**81**	**94**	**111**
Citrus fruits (Oranges, Mandarins, and Lemons)	2	0.1	5	0.1	9	0.1	21	0.2	49	0.3	0.2	0.4	0.5	1.1	2.4
Avocados	5	0.1	6	0.1	8	0.1	10	0.1	17	0.1	0.6	0.7	0.8	0.9	1.3
Bananas	7	0.2	15	0.2	23	0.3	44	0.4	75	0.4	0.7	1.3	2.1	3.5	5.7

Mangos	2	0.1	4	0.1	7	0.1	10	0.1	22	0.1	0.2	0.6	0.8	0.9	1.6
Papayas	0	0.0	1	0.0	2	0.0	4	0.0	13	0.1	0.0	0.1	0.2	0.4	0.9
Other fruit	3	0.1	5	0.1	8	0.1	17	0.1	52	0.3	0.3	0.4	0.4	0.6	1.7
Total Fruit	**19**	0.5	**37**	0.5	**58**	0.6	**106**	0.9	**228**	1.2	**2**	**3**	**5**	**7**	**14**
Total Vegetables and Fruit	418	10.2	698	10.3	907	10.1	1194	9.9	1639	9.0	51	73	86	102	125

Source: Own calculation using HCES 2016

5.5.3 Hot spot spatial analysis of vegetables and fruit consumption

Figure 5.14 shows areas with hot spots and cold spots for vegetable and fruit consumption. High positive z-scores on the map indicate significant hotspots (red) of consumption of vegetables and fruit, while negative low z-scores marked in blue show cold-spots that had exceptionally low consumption of vegetables and fruits. The analysis shows that most of the hot spots were located in Central Oromiya and Northern SNNP (Central Rift Valley), which produced a large share of vegetables using irrigation and to supply the local markets. Addis Ababa, Diredawa, and Harari, the three dominantly urban administrations, also had a clustering of high consumption of vegetables and fruit. The southern part of Beneshangul Gumuz region (around Assosa town) also had vegetable and fruit hot spots. Areas around Lake Abbe, part of the Awash River, were also hot spot areas signifying the relatively higher consumption of fruit and vegetables. Most of Amhara, Tigray, Afar, Somali, and SNNP had widespread cold spots, signifying the exceptionally low consumption of vegetables and fruit.

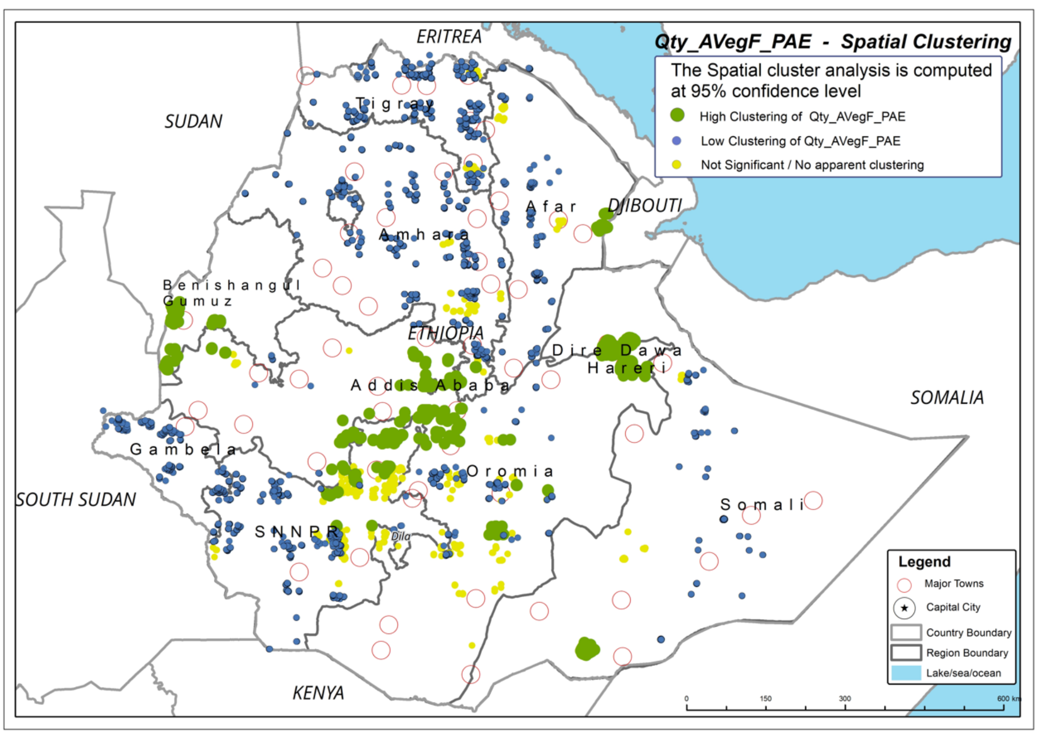

FIGURE 5.14: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF QUANTITIES OF VEGETABLES AND FRUITS CONSUMPTION

Source: Own calculation using HCES 2016

5.5.4 Determinants of vegetables and fruit consumption

In this sub-section, the determinants of the quantities of vegetables and fruit consumed are estimated using GLS regression with HCES datasets for the years, 2000, 2005, 2011, and 2016. To estimate the quantities of vegetables consumed, the annual quantities of green leafy vegetables, onions, tomatoes, carrots, garlic, and other vegetables reported to have been consumed by the household members in the survey years are divided by the adult equivalent of the respective households. The same procedure has also been applied for the quantities of fruit (citrus fruits, avocados, bananas, mangos, papayas, and other fruits) reported to be consumed by the household members during the survey years. GLS regression was run on the pooled datasets of the four survey years.

The regression coefficients suggest that male-headed households tended to consume smaller quantities of fruit and vegetables compared to those of female-headed households. Female headship is associated with relatively larger quantities of vegetables and fruit PAE. This may be explained by the greater awareness of women of the health benefits of fruit and vegetables for their family and body weight consciousness compared to that of men. Moreover, their headship of the households gives them the command over the use of the available resources on nutrient-dense foods, including vegetables and fruit.

The level of education attained by the household head is another key determinant of the quantities of fruit and vegetables consumed in urban Ethiopia. Educational attainment was classified as no formal schooling, primary school (Grades 1 to 6), secondary school (Grades 7 to grade 12), and tertiary (post-secondary school education). Controlling for other factors in the model, households headed by those who had attained primary education, on the average, consumed 6kg more vegetable PAE per year compared to those households that had heads without any formal education. Similarly, households that had heads that had attained secondary and tertiary education consumed 14.3kg/AE/year and 30.8kg/AE/year more vegetables than the reference category (no formal education). The results clearly suggest that the quantities of vegetables PAE consumed increases significantly as the level of formal education attained by the household head increased. The GLS regression coefficients similarly suggested a positive association among the quantities of fruit consumed with an increase in the level of education attained by the household head. Although the coefficient for primary education was not statistically significant, it was still positive compared to the reference population. The results, in general, suggested that education of the household head was an important and significant determinant of the consumption of fruit and vegetables in urban Ethiopia. The consistent and significant association between the level of education and the consumption of vegetables and fruit may reflect a likely increase in health and nutrition literacy as the level of education advances. Those who were better educated were more likely to have a better awareness about the health benefits of fruit and vegetables to prevent chronic diseases.

The adult equivalent of the household was significantly and negatively associated with the quantities of vegetables and fruits consumed. Holding other variables constant, a unit increase in adult equivalent, on average, decreased the annual quantities of vegetables consumed by 3.7kg PAE per year and annual quantities of fruit by 0.2kg PAE per year. This result suggests that households that had a smaller adult equivalent tended to have better consumption of fruit and vegetables in contrast with those with a larger adult equivalent.

The age of the household had a significant association with the quantities of vegetables consumed, while no significant association emerged with the quantities of fruit PAE consumed. In contrast with the reference group (households that had household heads below 30 years), the quantities of vegetable consumed for households headed by men and women in the age ranged between 31 and 50, decreased. On the other hand, for the old age group of 51 and above, the quantities of vegetables PAE per day increased compared to the reference category. This means that the consumption of vegetables decreased in the middle age and then increased as the age of the household advanced. The mean age of the household, which indicates the mean age of the household members, did not have a statistically significant association with quantities of vegetables consumed PAE per day. As the mean age increased by one year, the average quantities of fruit consumed, decreased by 0.0609kg or for every increase in the age of the household head by ten years, the consumption decreased by slightly above half a kilogram. Although the negative association of the mean age with the quantities of fruits consumed was marginally small, it was still statistically significant, suggesting that the age composition of the household had a negligible effect on the consumption of fruit in urban Ethiopia.

The regression coefficients clearly depict consistent and significant association between the quintile of expenditure PAE and the quantities of vegetables and fruits PAE consumed. The quantities of vegetables and fruits PAE consumed increased as one moved from the poorest quintile (quintile 1) to the richest quintile (quintile 5). Holding other variables in the model constant, compared to the reference category (the poorest quintile), on average, households in the second, third, fourth and the richest quintiles, reported consuming 12kg /AE/year, 20kg /AE/year, 26kg /AE/year, and 36kg /AE/year more vegetables, respectively. Similarly, a positive association emerged between the expenditure PAE quintile of households and the quantities of fruits PAE consumed. This means, as we move from the poorest quintile to the richest quintal, the quantities of vegetables and fruits consumed increased significantly. The strong positive association between the income level, as proxied by the expenditure PAE quintile groups, and the quantities of vegetables and fruits consumed, suggests that the better-off households tended to consume larger quantities of vegetables and fruits.

The marital status of the household head had a significant effect on the quantities of vegetables consumed by the household members. In contrast with households that had never-married heads (reference), conjugal households consumed 28.4kg more vegetables PAE per year. This may mean that marital life encourages the adherence to shared behaviours/norms at the household level that promotes the consumption of healthy foods like vegetables. The other marital group (divorced /separated/ widowed) that were once married but were no longer in a conjugal union consume 9.7kg more vegetables PAE per day compared to the reference category. Terminating their marital life due to divorce, separation or death of partner may pose economic, social, and psychological constraints to comply with healthy eating behaviours that include vegetables. On the other hand, the smaller quantities of vegetable consumption associated with households headed by never-married heads may suggest that these categories do rely on fast foods, and their living arrangement does not encourage them to devote their time to preparing and consuming fresh food at home, including vegetables. There is no significant difference among the three marital categories in terms of the quantities of fruit consumed.

The regression coefficients suggest that urban centres in Central, Southern and Southwest Ethiopia tended to have larger amounts of vegetables and fruit consumption. This was in line with expectations, as this part of the country is known for its production of fruits and vegetables that supplies to the other parts of the country. Compared to the Northern towns, the average urban dweller in Central, Southern and Southwest Ethiopia consumed 26.4kg more vegetables PAE per year and 4.7kg more fruits PAE per year. Addis Ababa is the centre of consumption and transition of commodities, including fruit and vegetables, which resulted in its better availability. Households in the city, on average, consume 13.3kg more vegetables PAE per year and 1.1kg more fruits PAE per year. Eastern towns also had a better consumption of vegetables and fruit compared to the reference category. Northern towns, where cereals dominated the consumption, had an exceptionally low consumption of vegetables and fruit.

TABLE 5.15: GLS PARAMETER ESTIMATES FOR QUANTITIES OF VEGETABLES AND FRUIT CONSUMED (KG/PAE/PER YEAR)

	MODEL (1) QUANTITY OF VEGETABLES (KG/PAE/PER YEAR)	MODEL (2) QUANTITY OF FRUITS (KG/PAE/PER YEAR)
Male	-29.97^{***}(-40.61)	-0.230(-0.84)
Age		
30 and below (Ref)	[Ref.]	[Ref.]
31 to 50	-2.160^{**}(-2.84)	0.156(0.56)
51 and above	5.340^{***}(4.55)	0.295(0.68)
Marital status		
Never married (Ref)	[Ref.]	[Ref.]
Married	28.36^{***}(32.21)	-0.0894(-0.27)
Divorced/ Separated/ Widowed	9.732^{***}(9.10)	-0.648(-1.64)
Education category		
No formal education (Ref)	[Ref.]	[Ref.]

	MODEL (1) QUANTITY OF VEGETABLES (KG/PAE/PER YEAR)	MODEL (2) QUANTITY OF FRUITS (KG/PAE/PER YEAR)
Primary school	6.410***(7.78)	0.500(1.64)
Secondary school	14.27***(17.70)	1.521***(5.09)
Tertiary level	30.75***(30.90)	3.989***(10.82)
Employment sector		
Informal sector (Ref)	[Ref.]	[Ref.]
Formal (Private)	0.803(1.15)	-0.464(-1.79)
Public and NGO	-6.712***(-7.80)	-1.825***(-5.73)
Other	-4.078***(-5.34)	-0.000520(-0.00)
Age_mean	0.0233(0.65)	-0.0609***(-4.58)
Adultequiv	-3.690***(-19.72)	-0.198**(-2.86)
Quintile (Exp PAE)		
Quintile 1 (Poorest) (Ref)	[Ref.]	[Ref.]
Quintile 2	11.54***(13.29)	1.113***(3.46)
Quintile 3	19.56***(22.11)	2.204***(6.73)
Quintile 4	25.50***(27.91)	4.037***(11.93)
Quintile 5 (Richest)	35.77***(36.38)	7.060***(19.39)
Zone		
Northern towns (Ref)	[Ref.]	[Ref.]
Central_S_SW towns	26.36***(39.95)	4.742***(19.40)
Eastern towns	9.223***(9.75)	1.372***(3.92)
Addis Ababa	13.33***(17.06)	1.125***(3.89)
_cons	30.67***(19.05)	1.408*(2.36)
N	54069	54069

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.5.5 Blinder-Oaxaca decomposition of vegetables and fruits consumption

The Blinder-Oaxaca decomposition was applied to investigate the changes that took place in the observed characteristics over a 16-year period that would explain the change in the average quantities of vegetables and fruit consumed in urban Ethiopia. Table 5.17 reports the aggregated average quantities of vegetables and fruit consumed in 2000 and 2016, the explained and unexplained portions of the difference between the two periods, and the contribution of each covariate to the explained component. The unexplained part of the table is not shown here to save space. The average consumption of vegetables and fruit increased from 38kg/AE/year in 2000 to 91kg/AE/year in 2016. The decomposition was performed for all sample households (results in the first column) and for each of the expenditure PAE quintiles to examine the distributional effect of the change among households having various levels of standard of living. The covariates in the model explained only a quarter of the increase in the quantities of vegetables and fruit between the survey periods. This means, the substantial portion of the change that took place over a 16-year period was driven by factors outside the socio-economic and demographic variables in the model. When the changes were decomposed, the change in the distribution of most of the covariates were found to have a statistically significant role in driving the consumption of vegetables and fruit upwards over the past 16 years in urban Ethiopia.

The change in real expenditure PAE, a proxy predictor of household income, has been the most important driver of the increase in the consumption of vegetables and fruit over the past 16-year period under consideration, accounting for 14% of the overall change and 57% of the explained change in terms of the quantities of vegetables and fruit consumed between the two survey periods. The change in real expenditure PAE, pronounced the effect on the increase in the consumption of vegetables and fruit, particularly, among households in the poorest quintile (Q1), whereby the accelerated improvement in the economic status (as measured by real expenditure PAE) of these households, explained 36% of the increase from 21kg/AE/year in 2000 to 53kg/AE/year in 2016.

The change in the distribution of the level of education attained by the household head between the two survey periods was an important driver of the increase in the consumption of vegetables and fruit that accounted for 8% of the increase. Among households in the richest quintile (Q5), the change in the distribution of the level of education attained by household head was found to be a significant driver of the change in the consumption of vegetables and fruit in the explained effect, whereby the covariate contributed around 11% of the changeover 16-year period. This may mean that the contribution of education, which may lead to literacy on the nutritional value of vegetables and fruit, may be as important as that of an improvement in the economic status, among the richest segment households (Q5) in promoting the consumption of vegetables and fruit. On the other hand, improvement in economic status, as measured by expenditure PAE, has a higher explaining effect than the household head's education level among households in the poorer quintiles.

The fertility transition in urban Ethiopia, which is manifested by a shrinking in the mean household size from 4.6 in 2000 to 3.7 in 2016, contributed to around 6% of the increased consumption of vegetables and fruits. Contracting household size over the period under consideration may enable households to obtain larger portions of vegetables and fruit to their limited household members. The observed characteristics of the household head, such as male household head, age of the household head, and marital status of the household head and the percentage share of the household budget devoted to food, made a statistically significant contribution to the change in the quantities of vegetables and fruit consumed, but the coefficients are rather small and negative.

TABLE 5.16: BLINDER-OAXACA DECOMPOSITION OF THE DIFFERENCE IN QUANTITIES OF VEGETABLES AND FRUITS CONSUMED BETWEEN 2000 AND 2016 BY EXPENDITURE PAE QUINTILE (OVERALL AND EXPLAINED PORTION)

	(1) ALL	(2) QUINTILE 1 (POOREST)	(3) QUINTILE 2 (POOR)	(4) QUINTILE 3 (MEDIUM)	(5) QUINTILE 4 (RICH)	(6) QUINTILE (RICHEST)
group_1=2016	91.13*** (0.587)	52.88*** (0.847)	76.71*** (0.969)	90.77*** (1.091)	106.5*** (1.304)	126.3*** (1.784)
group_2=2000	37.94*** (0.363)	21.48*** (0.552)	26.36*** (0.627)	31.20*** (0.563)	40.44*** (0.629)	63.79*** (1.008)
difference	53.19*** (0.690)	31.40*** (1.011)	50.35*** (1.154)	59.57*** (1.227)	66.05*** (1.448)	62.54*** (2.050)
explained	13.00*** (0.617)	7.727*** (1.444)	8.612** (3.290)	13.41*** (4.044)	21.97*** (4.027)	16.63*** (2.094)
unexplained	40.19*** (0.761)	23.67*** (1.589)	41.74*** (3.397)	46.16*** (4.068)	44.08*** (4.042)	45.91*** (2.527)
explained						
Male	-0.669*** (0.188)	-0.0000171 (0.0381)	-0.0110 (0.0522)	-0.453* (0.215)	-1.388** (0.444)	-1.297 (0.951)
Age	-0.645*** (0.169)	-0.180 (0.180)	-0.622* (0.289)	0.0432 (0.452)	-0.996* (0.485)	-2.447*** (0.621)
real_exp_PAE	7.434*** (0.475)	11.42*** (1.015)	7.499* (3.179)	10.09* (3.999)	16.46*** (3.966)	7.944*** (1.452)
Age_mean	-0.0747 (0.0385)	-0.304* (0.144)	-0.198 (0.145)	-0.0297 (0.0829)	-0.0811 (0.0950)	-0.148 (0.158)
hh_size	3.422*** (0.212)	0.908*** (0.199)	2.659*** (0.394)	2.950*** (0.446)	3.698*** (0.517)	3.215*** (0.661)
educ	4.277*** (0.426)	-0.437 (0.811)	2.455** (0.854)	4.216*** (0.817)	4.480*** (0.906)	7.133*** (1.015)
emp	0.521 (0.353)	-0.390 (0.557)	-0.656 (0.697)	-0.966 (0.650)	1.488* (0.745)	2.994** (1.022)

	(1) ALL	(2) QUINTILE 1 (POOREST)	(3) QUINTILE 2 (POOR)	(4) QUINTILE 3 (MEDIUM)	(5) QUINTILE 4 (RICH)	(6) QUINTILE (RICHEST)
marit	-0.826*** (0.232)	-0.0323 (0.214)	-0.611** (0.236)	-1.658*** (0.457)	-1.411* (0.583)	-0.945 (0.789)
pct_food_exp	-0.439*** (0.118)	-3.260*** (0.484)	-1.904*** (0.421)	-0.784* (0.317)	-0.279 (0.179)	0.185 (0.141)
N	28460	5245	5558	5828	5890	5938

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: the explanatory variables are Male (male headed households), Age (Age of the household head), real_exp_PAE (real expenditure per adult equivalent), Age_mean (mean ae of the household), hh_size (household size), educ (level of education of the household head), emp (employment of the household head), marit (marital status of the household head), pct_food_exp (percentage share of expenditure on food).

Source: Own calculation using HCES 2000 and 2016

5.6 PATTERNS AND DETERMINANTS OF THE CONSUMPTION OF PROCESSED AND ULTRA-PROCESSED FOODS (UPF) IN URBAN ETHIOPIA

The first part of this section examined the patterns of change and trends in the consumption of processed and ultra-processed foods (UPF). The emphasis in the following sub-sections is only on UPF, owing to their significance to the issue of our topic-nutrition transition. The study looked at the spatial clustering analyses, determinants, and drivers of UPF change between 2000 and 2016.

5.6.1 Patterns and trends of change of processed and ultra-processed foods consumption (UPF)

The food categories analysed under this section are non-alcoholic beverages, alcoholic beverages, sugar, spices and salt, restaurant foods, and ultra-processed foods. The level of processing of food items differs based on the level of physical, chemical, or biological modifications of the raw materials. According to the NOVA classification, this ranges from minimally processed (pressing, grinding, milling, and refining of, for example, sugar, honey, spices, salt, tea, and coffee) to those that underwent ultra-processing through a series of industrial techniques and processes (Center for Epidemiological Research in Nutrition and Health 2018; Monteiro, Cannon, Moubarac, Levy, Louzada & Jaime 2018).

From the non-alcoholic beverages category, coffee and tea constitute the most consumed in urban Ethiopia. The average household expenditure on coffee and tea consistently increased during the 16-year period under consideration, albeit the average food budget share remained between 5% and 6%. On the other hand, the average quantity of tea and coffee consumed per adult equivalent, after increasing from 3.4kg/AE/year in 2000 to 5kg/AE/year in 2005 and 13.5kg/AE/year in 2011, went down to 9.7kg/AE/year in 2016. Despite the fact that the household budget dedicated to coffee and tea increased by 18% between 2011 and 2016, the quantities decreased by 28% during the same period, implying that the consumption of coffee and tea tended to decrease primarily due to the price increase. The consumption of non-alcoholic beer and spring mineral water constituted a negligible proportion of the household food budget and quantities, although an increasing trend was witnessed over the 16-year period between 2000 and 2016.

For this analysis, the list of alcoholic drinks consumed are categorised into homemade traditional fermented alcoholic drinks *(tella, tej, katikala-areke,)* and factory processed alcoholic drinks (beer, wine, spirits, for example). The alcohol consumption data for the year 2000 is not available and thus the comparison is for the three survey years of 2005, 2011, and 2016. The consumption of homemade alcoholic drinks changed slightly between 2005 and 2016, both in terms of the household budget and the quantities consumed. The average consumption of home-made alcoholic drinks increased modestly from 7.7kg/AE/year in 2005 to 8.6kg/AE/year in 2016.

On the other hand, although the quantities of factory-processed alcoholic drinks consumed were below the home-made alcoholic drinks, their consumption was rising rapidly in terms of both the household budget and quantities consumed. In 2005, the average factory-processed alcoholic drink increased from 0.2kg/AE/year in 2005 to 1.4kg/AE/year in 2011 and 2.2kg/AE/year in 2016 and increased by 11-fold over the period of 11 years. The average per adult equivalent real expenditure on factory processed alcoholic drinks was only 13 Birr in 2005 which rose to 69 Birr in 2016. This is a clear indication that the traditional home-made alcoholic drinks were being replaced by factory processed alcoholic drinks over time.

The consumption of dietary sugar, which is associated with increased obesity and dental caries, and thus considered as an important vehicle for accelerating the nutrition transition, can be obtained from free sugars and other sweet sources. In this section, free sugars refer to those bought by households as packaged sugar to be added to foods and drinks in the form of granulated sugar, as well as syrup, molasses, sucrose, and honey. The intake of sugar in soft drinks, fruit juices, jams, chocolates, cakes, biscuits, and pastries are discussed under the ultra-processed food groups.

Household real expenditure on sugar showed a generally downward trend between 2000 and 2011 and increased slightly in 2016. However, the quantities of sugar consumed increased from 6.3kg/AE/year in 2000 to 9.7kg/AE/year in 2016, an increase of 54 % over the 16-year period. The increase in the consumption of sugar is underpinned by the consistently decreasing actual price of sugar over the period under consideration. Honey constitutes an exceedingly small proportion of the dietary sugar consumption in urban Ethiopia. Overall, the calories derived from sugar, other sources of sugar and honey showed a consistent increase from 65 kcal/AE/day in 2000 to 105 kcal/AE/day in 2016, albeit the proportion of dietary energy remained within 3% to 4% during the same period. The trend analysis clearly suggests that the consumption and, hence, the calories derived from sugar is rising from time to time despite its contribution to overall dietary energy and the proportion of household budget allocated to it remained more or less stable.

In this study, foods away from home (FAFH) are classified into restaurant foods and fast foods. The former is usually a formal meal that are sold at restaurants while the latter can be sold at cafeterias, at roadside vendors or retail stores. Both types of FAFH may also be available at workplace canteens, and schools, usually at subsidised prices. Restaurant foods mostly comprise traditional Ethiopian foods, such as *injera* or bread with different sauces prepared from meat (beef, poultry, mutton, goat), fish, eggs, cottage cheese, vegetables, spices, and pulses. In addition, some western dishes prepared from rice, pasta, meat, and vegetables are also included in the restaurant foods consumed by the residents of urban Ethiopia. The second category of FAFH includes fast foods like pizzas, burgers, sandwiches, doughnuts, cakes, cookies, biscuits, and other candies or sweets. These are ultra-processed “western” foods designed to be hyperpalatable (high in fats, salt, and sugar) and instrumental in bringing the nutritional transition in different countries.

The data collected by HCES includes the types of meals and expenditure on away-from-home meals had been collected at the individual level of household members and aggregated to the household level data. Given that the data collected are only about the types of meals and the expenditure and no measurement of the meals has been conducted during data collection, the estimation of the dietary energy (calories) derived from meals consumed away from home is likely to suffer from the bias of the assumptions. The conversion of the meals into calories has been made by applying the standard Ethiopian food composition table.

As is clearly suggested by the household expenditure spent on FAFH, their importance is growing in the lives of residents of urban Ethiopia. The real household expenditure PAE on restaurant foods grew from 495 Birr/AE/year in 2005 to 1,036 AE/year Birr in 2016, an increase of 109%. During the same period, the proportion of household food budget spent on restaurant foods surged from 8% to 12%, implying the increased importance of FAFH over time.

Household expenditure on fast foods (pizzas, burgers, and sandwiches, for example) is also growing, but it still constituted only 2% of the household food budget in 2016. In 2005, the household budget spent on these fast foods was at around 33 Birr/AE/year and rose to 202 Birr/AE/year in 2016. The consumption of cakes, cookies, biscuits, fried dough snacks (like doughnuts and samosas) is still exceptionally low in urban Ethiopia and did not exhibit a meaningful change over the period between 2005 to 2016. During the same period, the average household expenditure on these western diets remained between 18 to 28 Birr/AE/year, representing below 1% of the food budget of households.

The consumption of soft drinks and sugary fruit drinks, which contain an extremely high amount of sugar, but few nutrients, is regarded as another critical features of the dietary shift leading to the nutrition transition. In urban Ethiopia, the consumption of these ultra-processed energy-dense beverages constitute around 1% of the household food budget. Between 2005 and 2016, the average consumption exhibited volatility. In 2005, the average consumption was around 28 litre/AE/year (around 93 bottles containing 300 ml) which plummeted to 5 litre/AE/year (around 17 bottles) in 2011 and then increased to ten litre/AE/year (around 33 bottles) in 2016. Despite there being an increase in the consumption of soft drinks between 2011 and 2016, it is still far below the 2005 level 2005, suggesting that the trend is not clearly discernible over the 11-year period under consideration. The consumption of factory-processed packed fruit juices including concentrated juices, dehydrated juices (powder), and nectarine juice (which contain pulp and sugar) represent a negligible proportion of the household expenditure in urban Ethiopia. Ultra-processed snack dressings (like ketchup, mayonnaise, or canned tomato sauces), jams, powdered milk, toffees, chocolates, and chewing gum constituted an exceedingly small proportion of the consumption of households in urban Ethiopia.

The density curves in Figure 5.14 indicate that the log of overall calories derived from UPF is increasing from time-to-time. In summary, the consumption of ultra-processed foods (UPF) and drinks constitute an exceedingly small proportion of the household budget and the calories derived from UPF are insignificant. Nevertheless, the trend tends to increase but at an extremely slow pace during the period between 2000 and 2016. Taking all UPF together, the average daily calorie intake from UPF that stood at 56 calorie PAE in 2005 decreased to 43 calorie PAE in 2011 and again increased to 64 PAE in 2016. Between 2005 and 2016, UPF represented between 2% to 3 % of the total dietary energy consumed by households in urban Ethiopia.

The major sources of UPF in urban Ethiopia are fast foods (pizzas, burgers, sandwiches, etc), which were virtually non-existent in the consumption list of 2000 and 2005 HCES, increased to 21 calories PAE per day in 2011 and 28 calories PAE per day in 2016. On the other hand, the second most consumed UPF are soft drinks, which showed an overall downward tendency as a source of dietary energy in urban Ethiopia. Overall, UPFs represented 0%, 3%, 3% and 4% of the household food budget in urban Ethiopia 2000, 2005, 2011, and 2016, respectively. The budget share allocated for UPFs tended to increase over time, but slowly.

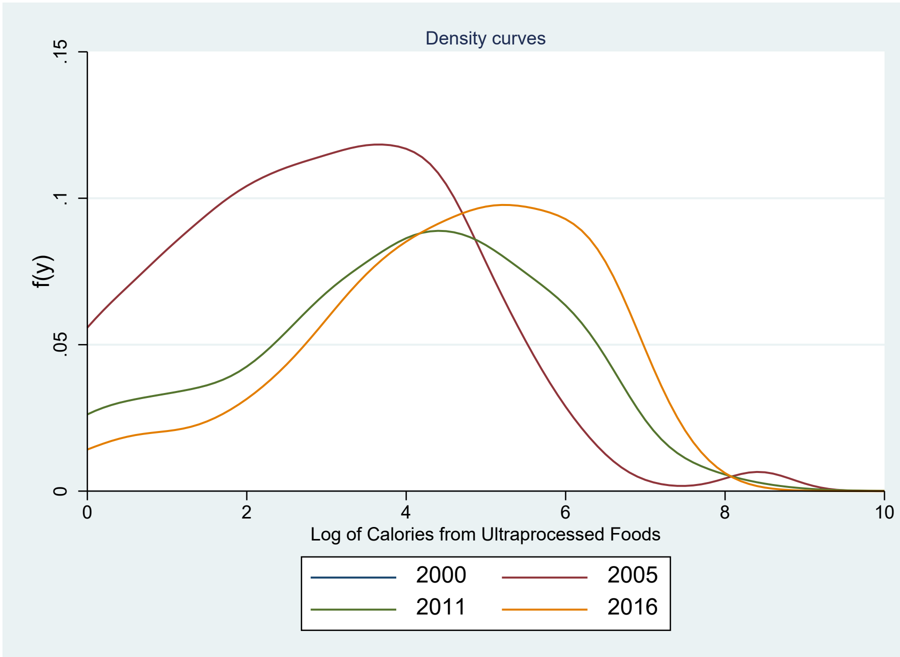

FIGURE 5.15: DENSITY CURVES DEPICTING THE EVOLUTION OF LOG OF CALORIES DERIVED FROM UPF (2005-2016)

Source: Own calculation using HCES 2005, 2011, 2016

TABLE 5.17: PATTERNS OF CONSUMPTION OF PROCESSED AND ULTRA-PROCESSED FOODS (2000, 2005, 2011, AND 2016)

FOOD ITEM/CATEGORY	BIRR/AE/YEAR								KG/AE/YEAR				CALORIE/AE/DAY							
	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% SHARE	2000	2005	2011	2016	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% share
Coffee and tea (including macchiato, cappuccino)	336	5%	341	6%	363	6%	427	5%	3.4	5.0	13.5	9.7	11	1%	35	2%	36.3	1%	31	1%
Non-Alcoholic beer	0	0%	0	0%	3	0%	4	0%		0.0	0.0	0.0	0	0%	1	0%	0.0	0%	2	0%
Spring Mineral Water	8	0%	7	0%	8	0%	20	0%	0.3	0.3	2.0	2.4	0	0%	0	0%	0.0	0%	0	0%
Non-Alcoholic beverages	**345**	**5%**	**348**	**6%**	**374**	**7%**	**451**	**5%**	**4**	**5**	**15**	**12**	**11**	**1%**	**36**	**2%**	**36**	**1%**	**33**	**1%**
Factory processed alcohol	0	0%	13	0%	18	0%	69	1%	0.0	0.2	1.4	2.2	0	0%	1	0%	3.5	0%	5	0%
Homemade alcohol	0	0%	31	1%	24	0%	37	0%	0.0	7.7	7.8	8.6	0	0%	24	1%	17.8	1%	19	1%
Alcoholic beverages	0	0%	44	1%	42	1%	106	1%	0	8	9	11	0	0%	25	1%	21	1%	24	1%
Sugar	270	4%	210	4%	178	3%	183	2%	6.3	6.6	8.6	9.7	67	4%	65	3%	90.3	3%	102	4%
Other sugar source	5	0%	3	0%	3	0%	3	0%	0.0	1.2	1.5	1.0	0	0%	3	0%	4.0	0%	3	0%
Honey	4	0%	7	0%	6	0%	8	0%	0.0	0.2	0.3	0.2	0	0%	1	0%	1.5	0%	1	0%
Sugar and honey	279	4%	220	4%	187	3%	194	2%	6	8	10	11	68	4%	69	3%	96	4%	105	4%
Pepper	324	5%	200	3%	329	6%	636	7%	2.7	3.9	5.8	5.6	24	1%	31	1%	56.0	2%	54	2%
Spices	43	1%	35	1%	19	0%	27	0%	0.5	1.3	0.8	0.6	3	0%	10	0%	7.0	0%	5	0%
Salt	50	1%	29	0%	20	0%	22	0%	3.4	4.1	4.3	3.8	0	0%	0	0%	0	0%	0	0%
Spices	417	6%	265	4%	368	6%	685	8%	7	9	11	10	27	1%	41	2%	63	3%	59	2%
Restaurant food (excluding fast foods)	0	0%	495	8%	652	11%	1036	12%	0.0	0.0	23.1	24.1	0	0%	79	4%	155.8	6%	146	5%
Restaurant food (excluding fast foods)	0	0%	495	8%	652	11%	1036	12%	0.0	0.0	23.1	24.1	0	0%	79	4%	155.8	6%	146	5%
Fast food (pizzas, burgers, sandwiches, etc)	0	0%	33	1%	80	1%	202	2%	0.0	0.0	3.6	5.5	0	0%	3	0%	21.1	1%	28	1%
Cakes, cookies, biscuits, and other candies or sweets	6	0%	16	0%	15	0%	17	0%	0.1	0.3	0.6	0.6	1	0%	2	0%	7.9	0%	8	0%
Fried dough snacks (donuts, bombolini, or samosas)	0	0%	2	0%	9	0%	11	0%	0.0	0.1	0.5	0.5	0	0%	0	0%	4.3	0%	4	0%

FOOD ITEM/CATEGORY	BIRR/AE/YEAR								KG/AE/YEAR				CALORIE/AE/DAY							
	2000	**% SHARE**	**2005**	**% SHARE**	**2011**	**% SHARE**	**2016**	**% SHARE**	**2000**	**2005**	**2011**	**2016**	**2000**	**% SHARE**	**2005**	**% SHARE**	**2011**	**% SHARE**	**2016**	% share
Soft drinks	10	0%	62	1%	55	1%	88	1%	0.0	28	5	10	0	0%	35	2%	4	0%	19	1%
Packed fruit juice	0	0%	8	0%	8	0%	12	0%	0.0	0.8	1.0	0.4	0	0%	3	0%	1.0	0%	0	0%
Snack dressing (Ketchup, mayonnaise, canned tomato sauce)	2	0%	7	0%	7	0%	10	0%	0.0	0.2	0.2	0.2	0	0%	1	0%	0.8	0%	1	0%
Jam	0	0%	0	0%	1	0%	0	0%	0.0	0.0	0.1	0.0	0	0%	0	0%	0.6	0%	0	0%
Toffees, chocolates, chewing gum	1	0%	1	0%	2	0%	3	0%	0.0	0.0	0.0	0.0	0	0%	0	0%	0.3	0%	0	0%
Infant formulas & drinks, and meal replacement shakes	3	0%	24	0%	4	0%	8	0%	0	1	0	0	1	0%	13	1%	2	0%	3	0%
Ultra-processed foods (UPF)	22	0%	155	3%	181	3%	352	4%	0	30	11	18	2	0%	56	3%	43	2%	64	2%
Total	1062	15%	1527	26%	1805	32%	2825	32%	17	61	80	85	117	6%	316	14%	426	16%	442	16%

Source: Own calculation using HCES 2000, 2005, 2011, and 2016

5.6.2 Ultra-processed foods (UPF) consumption by expenditure PAE quintiles

Using HCES 2016 data, the UPF intake as measured by the total calories arising from these food categories increase with an increase in expenditure PAE quintile from the poorest to the richest. Households in the poorest quintile, on average, consume a mere 20 calorie PAE per day from UPF, which represents just 1% of their overall dietary energy intake. For the richest quintile (Q5), UPF represent around 146 calorie PAE per day which is more than seven-fold the consumption of the poorest quintile (Q1). The UPF constituted 2%, 2%, 3% and 4% of the overall dietary energy intake of Q2, Q3, Q4, and Q5, respectively. This may imply that households tend to shift to UPF as they get richer in urban Ethiopia.

A pronounced difference between the poorer and the richer groups is observed in terms of the consumption of fast foods (pizzas, sandwiches, and burgers, for example), that represented around 2.4% of the dietary energy among the richest quintile and 0.2% among the poorest of the overall dietary energy intake. Soft drinks are the second most important types of UPF consumed by urban Ethiopian households representing between four calories PAE per day (Q1) and 38 calories PAE per day (Q5). The consumption of UPF, such as, cakes, cookies, biscuits, and other candies and fried dough snacks (doughnuts, *bombolini* and samosas) is negligible both among the rich and the poor categories. The contribution of dietary energy derived from other types of UPF is negligible and no significant difference is observed between poorer and richer groups. Thus, the most important types of UPF that tend to increase with the rise in income level, as proxied by expenditure PAE quintile, are western diets, such as, pizzas, sandwiches, burgers, and soft drinks, while the shift to other UPFs has little to do with income change.

TABLE 5.18: CALORIES CONSUMPTION DERIVED FROM UPF AND PERCENTAGE SHARE OF UPF CALORIES OUT OF THE TOTAL DIETARY CALORIES INTAKE BY EXPENDITURE QUINTILE (2016)

TYPE OF FOOD	QUINTILE 1		QUINTILE 2		QUINTILE 3		QUINTILE 4		QUINTILE 5		TOTAL	
	KCAL/AE/DAY	% SHARE	KCAL/AE/DAY	% SHARE	KCAL/AE/DAY	% SHARE	KCAL/AE/DAY	% SHARE	KCAL/AE/DAY	% SHARE	KCAL/AE/DAY	% SHARE
Powdered Milk	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0
Fast foods (pizza, sandwich, burger, etc)	5	0.2	13	0.5	25	0.8	44	1.4	86	2.4	28	1.0
Packed Fruit	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0
Soft drinks	4	0.2	12	0.4	23	0.8	29	0.9	38	1.1	19	0.7
Manufactured baby foods	4	0.2	3	0.1	2	0.1	1	0.0	1	0.0	2	0.1
Snack dressing (Ketchup, mayonnaise, canned tomato, etc)	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
Cakes, cookies, biscuits, and other sweeties	4	0.2	9	0.3	7	0.2	9	0.3	13	0.4	8	0.3
Fried dough snacks (donut, bombolini, samosa, etc)	3	0.1	5	0.2	5	0.2	5	0.1	3	0.1	4	0.1
Toffees, chocolate, chewing gum	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Jam	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	**20**	**1.0**	**43**	**1.6**	**63**	**2.1**	**89**	**2.7**	**146**	**4.0**	**63**	**2.2**

Source: Own calculation using HCES 2016

5.6.3 Hot spot spatial analysis of ultra-processed foods (UPF) consumption

Figure 5.16 depicts the spatial hot spot analysis findings, which reveal areas with high and low clustering of UPF consumption as measured by calories generated from UPF PAE. The key areas with high concentrations of UPF consumption are in Eastern Ethiopia. Cold spot areas with the high clustering of low ASF consumption are seen in northern, western, and central Ethiopia. The cold spot areas of UPF overlap with agricultural crop producing areas, whereas the hotspots are concentrated in areas where there is a low potential for crop production.

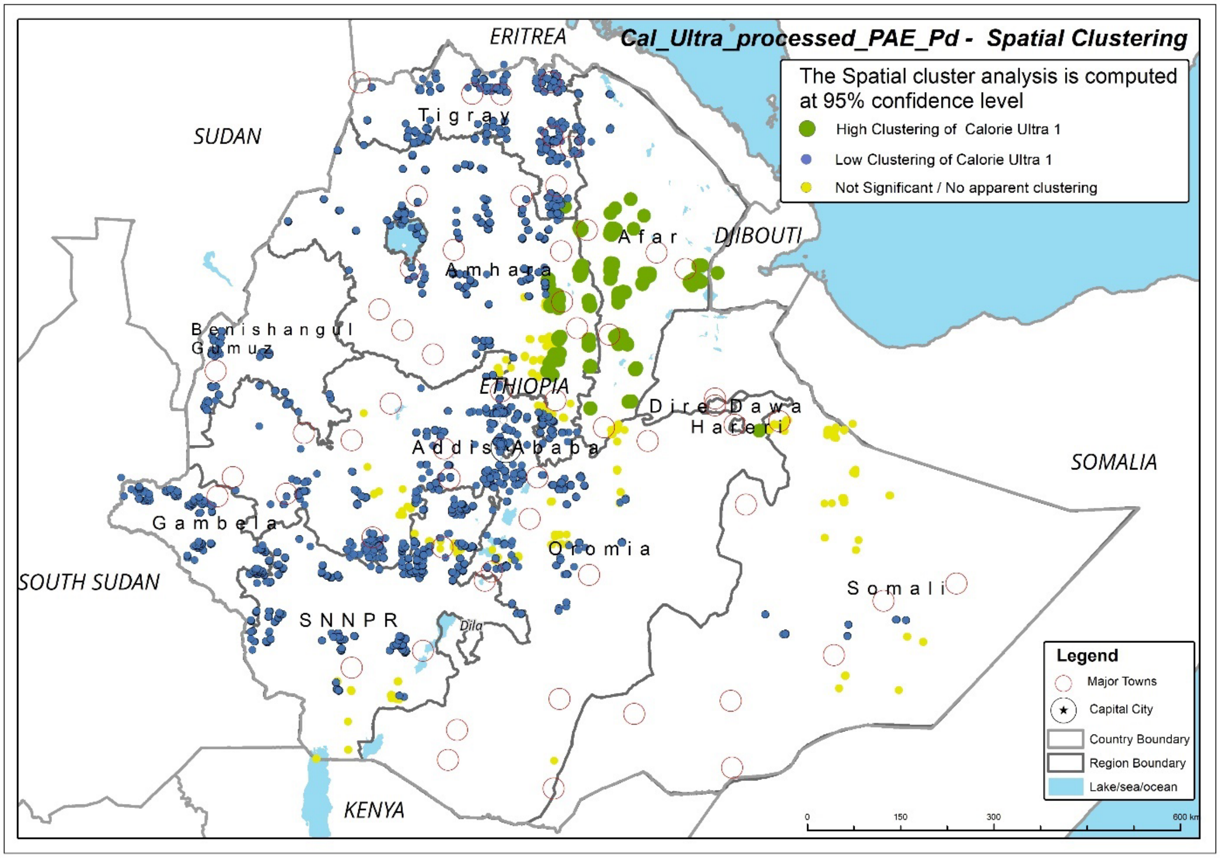

FIGURE 5.16: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF UPF CONSUMPTION

Source: Own calculation using HCES 2016

5.6.4 Determinants of the consumption of ultra-processed foods (UPF)

To identify the determinants of the consumption of ultra-processed foods in urban Ethiopia, the HCES data for the years 2000, 2005, 2011, and 2016 were pooled and GLS regression were run on two indicators. The first indicator is the log of calorie derived from ultra-processed foods PAE per day, which is intended to measure the average calories sourced from ultra-processed foods the household members consumed. The second indicator is the share of calorie the household members derived from UPF out of the total calories consumed. The calorie derived from UPF is calculated by adding-up the total calorie the households acquired from such items as pizzas, burgers, sandwiches, cakes, cookies, biscuits, and candies, fried dough snacks, soft drinks, packed fruit juices, snack dressings, jams, toffees, chocolates, chewing gum, infant formulas, meal replacement shakes, etc. The results of the two models are presented in Table 5.20.

Keeping other variables in the model controlled, male headed households tended to consume significantly higher amounts of calories derived from ultra-processed foods PAE per day. Compared to female-headed households (reference), male headed households on average, consume 104 more calories PAE per day and the share of the calories from UPF increases by 2%. This result may imply that female-headed households tend to cook and consume food at home while male-headed households have the tendency to consume more UPF away from home.

The age group of the households depicts that the consumption of UPF progressively decreases as we move from the young age group (30 years and below) to the older age group (51 years and above). Compared to the reference category (30 years and below), households headed by those in the middle age category (31 to 50 years) and older age (51 years and above) on average consume 31 and 52 fewer calories PAE per day, respectively. Similarly, the mean age of the household also has a significantly negative effect on the consumption of UPF. This implies that the consumption UPF is shaped significantly by the age of the household head and members. Households that have younger heads tend to have a relatively higher preference for the UPFs compared to the older heads of households that usually stick to the traditional dietary pattern dominated by cereals and pulses. Moreover, younger heads are more likely to have smaller children that tend to consume more UPF in the form of processed dairy products, juices, baby, and foods.

The results of the model suggest that the marital status of the household head has an important effect in shaping the consumption of UPF significantly after the other variables in the model are held constant. The consumption of UPF is relatively higher among households headed by never married people. Compared to the never married (reference) category, married and divorced, separated and/or widowed consume 73 and 53 fewer calories PAE per day derived from UPF, respectively. The relative contribution of UPF for overall dietary energy intake is 4% and 2% less than the reference category, respectively. It is plausible that latter groups tended to consume traditional foods prepared at home while the never married ones have opportunities to consume UPFs outside home due to factors related to social, cooking facilities, or convenience.

The relationship between the level of education of the most dominant decision-maker at household level (household head) and the calories derived from UPFs does not seem linear, as suggested by the regression coefficients. The primary education and secondary education attainers on the average consume fewer calories from UPF as compared to those without formal education (reference category). However, households with tertiary education attainer heads consume more calories from UPF than the reference category. Households headed by tertiary education attainers and those without any formal education are consumers of relatively larger dietary energy from UPF.

The level of income of households as proxied by expenditure PAE quintile is positively associated with consumption of UPFs and the magnitude of difference across quintile groups is pronounced. The richest quintile (Q5) is the highest consumer of UPF, 909 more calories PAE per day as compared to the poorest quintile (Q1). Households in Q2, Q3, and Q4 on the average consume 52, 126, 287 more calories PAE per day derived from UPFs as compared to the reference category. The observed variation in the consumption of UPFs may have been significantly shaped by the level of income of households signifying that UPFs are the foods of the richer households in urban Ethiopia. As the income of households rise, they tend to shift from the traditional starchy staples to the consumption of UPF and other high-value foods. The positive gradient between quintile and calorie intake from UPF may be partly because UPF are more costly than unprocessed foods such as starchy staples that are the main sources of dietary energy for the poorer households.

For the geographical zones, the UPF consumption seems to be higher in Eastern Ethiopia urban centres that may reflect the cultures of the people, location proximate to neighbouring countries that have the culture of eating UPF, and availability of outlets providing the supply for the people in the area.

TABLE 5.19: GLS PARAMETER ESTIMATES OF LOG OF CALORIES (KCAL/AE/DAY) AND PERCENTAGE OF CALORIES DERIVED FROM UPF

INDEPENDENT VARIABLES	MODEL (1) LOG OF CALORIES DERIVED FROM ULTRA-PROCESSED FOODS PAE PER DAY	MODEL (2) PERCEBTAGE OF CALORIES DERIVED FROM ULTRA-PROCESSED FOODS
Male	0.717^{***}(19.58)	1.909^{***}(22.36)
Age		
Below 30 (Ref)	[Ref.]	[Ref.]
31 to 50	-0.366^{***}(-9.70)	-0.732^{***}(-8.33)
51 and above	-0.739^{***}(-12.70)	-1.597^{***}(-11.78)
Marital status		
Never married (Ref)	[Ref.]	[Ref.]
Married	-1.322^{***}(-30.23)	-3.609^{***}(-35.45)
Divorced/ Separated/ Widowed	-0.766^{***}(-14.43)	-2.158^{***}(-17.45)
Education category		
No formal education (Ref)	[Ref.]	[Ref.]
Primary school	-0.199^{***}(-4.86)	-0.213^{*}(-2.24)
Secondary school	-0.123^{**}(-3.08)	-0.390^{***}(-4.19)
Tertiary level	0.225^{***}(4.56)	-0.104(-0.91)
Employment sector		
Informal sector (Ref)	[Ref.]	[Ref.]
Formal (Private)	0.0527 (1.52)	0.242^{**}(2.99)
Public and NGO	-0.199^{***}(-4.66)	-0.0513(-0.52)
Other	0.0311(0.82)	-0.200^{*}(-2.26)
Age_mean	-0.0112^{***}(-6.27)	0.0265^{***}(6.39)
adultequiv	-0.000724 (-0.08)	-0.159^{***}(-7.36)
Quintile (Exp PAE)		
Quintile 1 (Poorest) (Ref)	[Ref.]	[Ref.]
Quintile 2	0.419^{***}(9.72)	0.0610(0.61)
Quintile 3	0.813^{***}(18.52)	0.169(1.65)
Quintile 4	1.352^{***}(29.81)	0.388^{***}(3.68)
Quintile 5 (Richest)	2.311^{***}(47.35)	1.614^{***}(14.19)
Zone		
Northern towns (Ref)	[Ref.]	[Ref.]
Central_S_SW towns	0.0116(0.36)	-0.187^{*}(-2.44)
Eastern towns	1.344^{***}(28.62)	1.088^{***}(9.94)
Addis Ababa	0.0313(0.81)	-0.657^{***}(-7.27)
_cons	0.452^{***}(5.65)	4.394^{***}(23.60)
N	54069	54069

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.6.5 Blinder-Oaxaca decomposition of UPF consumption

The observed overall calorie consumption of UPF in 2000 was exceptionally low (only 2 calories PAE per day) and decomposing the change between 2000 and 2016 may lead to spurious results. As a result, the change in the calorie consumption of UPF between 2005 and 2016 are decomposed to identify the drivers of the change over a 11-year period. The decomposition output presents the mean predictions by groups and their difference in the top panel of Table 5.21. The mean of calories derived from UPF was standing at 67 calories PAE per day in 2005 and increased to 118 calories PAE per day in 2016, resulting a difference of 51 calorie PAE per day. The increase was particularly substantial among households in the fifth and fourth quintiles, whereby the consumption of UPF surged by 141 and 68 calories per day, respectively. The covariates in the Blinder-Oaxaca decomposition model explained only 42% of the overall change, suggesting that the changes in the consumption of calorie from ultra-processed foods over the last 11-year period are largely explained by factors other than the household characteristics in the model. These characteristics may include the change in the overall food environment that made UPFs available and accessible for people in urban Ethiopia.

The lower panel of Table 5.21 presents the individual contribution of explanatory variables from the decomposition analysis. Unlike the other food groups in this study (refined cereals, ASF, VF, and fats and oil), the real expenditure PAE is not the number one driver of change of consumption, but it still explained 5% of the change in the calories derived from UPF between 2005 and 2016. Explaining 11% of the change over the 11-year period, the change in the percentage of household budget dedicated to food is found to be the most important driver of the change in the consumption of UPF in urban Ethiopia. The change in food budget share of the fifth and fourth quintiles, which went upwards between the survey years, explained 38% and 36% of the change in the consumption of calories from UPF.

This implies that the rich 40% segment of population increased the proportion of their food budget to buy UPF for their household consumption, while the role of the change in food budget played little for the relatively poorer households. In other words, the richer households tend to increase their expenditure on UPF, which led to increased consumption. Moreover, the result also implies that the observed increase in the consumption of UPF has more to do with the increase in the food budget share rather than the increase in real expenditure PAE.

The change in the composition of the household characteristics, age of the household head and household size, each explained 9% of the increase in the calorie intake derived from UPF. The drop in the mean age of the household head and mean household size observed between the survey periods (see Table 5.1), resulted in an increase in the consumption of UPF. The change in marital status of the household head and the mean age of the household head explained 5% and 3% of the change in the consumption of UPF, respectively. The contribution of change in employment sector and level of education attained by the household head on the change in calorie derived from UPF are statistically significant, but rather small. It is particularly worth noting that the change in the level of education attained by the household head, that have a substantial contribution in the increased consumption of other food categories (refined cereals, ASF, VF, and fats and oil) in this study, have a negligible and depressing effect on the change in the consumption of UPF over the past 11 years period between 2005 and 2016.

TABLE 5.21: BLINDER-OAXACA DECOMPOSITION OF THE DIFFERENCE IN CALORIES DERIVED FROM UPF CONSUMED BETWEEN 2005 AND 2016 BY EXPENDITURE PAE QUINTILE

	ALL	QUINTILE 1(POOREST)	QUINTILE 2 (POOR)	QUINTILE 3 (MEDIUM)	QUINTILE 4 (RICH)	QUINTILE 5 (RICHEST)
group_1=2016	118.6*** (2.024)	38.59*** (2.217)	74.25*** (3.892)	99.01*** (3.937)	137.1*** (4.653)	238.8*** (6.134)
group_2=2005	67.13*** (3.581)	46.26*** (8.265)	59.62*** (8.765)	61.92*** (8.342)	69.14*** (7.597)	98.05*** (6.984)
difference	51.44*** (4.114)	-7.676 (8.558)	14.64 (9.591)	37.10*** (9.224)	68.00*** (8.909)	140.8*** (9.295)
explained	21.47*** (2.616)	2.091 (5.348)	10.24 (11.92)	34.04* (13.35)	52.82*** (13.49)	64.26*** (7.259)
unexplained	29.96*** (3.657)	-9.767 (7.782)	4.392 (12.26)	3.060 (13.54)	15.18 (12.82)	76.53*** (7.869)
explained						
Male	-0.258 (0.306)	0.00385 (0.0688)	-0.422 (0.494)	-0.935 (0.770)	0.0473 (0.624)	0.372 (1.402)
Age	4.728*** (0.593)	3.250*** (0.901)	6.403*** (1.783)	2.422* (0.986)	4.798** (1.461)	2.583* (1.218)
real_exp_PAE	2.490 (1.802)	-0.663 (5.407)	9.229 (11.60)	26.07* (11.94)	22.84* (11.61)	1.391 (1.168)
Age_mean	1.593*** (0.329)	0.0189 (0.123)	1.448* (0.735)	0.348 (0.500)	2.279* (0.922)	2.585* (1.065)
hh_size	4.376*** (0.803)	1.130 (1.772)	0.879 (1.927)	1.613 (1.476)	0.170 (1.522)	3.676* (1.724)
educ	-0.751 (1.011)	-1.301 (1.202)	-7.247*** (1.991)	-4.045* (1.779)	-6.425** (2.271)	-3.134 (2.714)
emp	1.091*** (0.257)	0.882* (0.445)	0.804* (0.386)	1.688** (0.614)	0.779 (0.425)	2.260** (0.860)
marit	2.791*** (0.626)	-0.0505 (0.593)	-0.0735 (0.996)	0.879 (1.213)	3.688* (1.614)	1.608 (1.849)
pct_food_exp	5.414*** (1.590)	-1.179 (0.744)	-0.777 (1.097)	5.996 (3.416)	24.64*** (4.140)	52.91*** (6.591)
N	31945	6155	6363	6447	6535	6443

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: the explanatory variables are Male (male headed households), Age (Age of the household head), real_exp_PAE (real expenditure per adult equivalent), Age_mean (mean ae of the household), hh_size (household size), educ (level of education of the household head), emp (employment of the household head), marit (marital status of the household head), pct_food_exp (percentage share of expenditure on food).

Source: Own calculation using HCES 2000 and 2016

5.7 PATTERNS AND DETERMINANTS OF FATS AND OILS CONSUMPTION

In this section, the fats and oil source food items collected in the HCES are categorised into four groups: butter (made from cow, camel, or goat milk), edible oil (palm oil, sunflower oil, soybean oil, sesame seed oil, Niger seed oil, and rape seed oil), edible vegetable ghee, and other fats (margarine, and groundnut butter). The biproducts of meat such as tallow, carcass fat, or poultry fat are not included. Despite these biproducts being important sources of fat consumption, it was not possible to cover them, because they are not separately collected in the HCES. The analysis about the consumption of these items is covered under the section dealing about the consumption of animal source foods.

5.7.1 Patterns and trends of change in the consumption of fats and oils

The overall real expenditure per adult equivalent on fats and oils did not show much change between 2000 and 2016. In 2000, an average household spends around 675 Birr/AE/year and it dropped to 644 Birr/AE/year in 2016. During the same period, the average share of household budget spent on fats and oil dropped from 10% to 7%. On the other hand, the quantities of fats and oil consumed surged from 6kg/AE/year to 16kg/AE/year, an increase of 167% over the period of 16 years. In 2000, fats and oil constituted only 123 kcal/AE/day which rose to 388 kcal/AE/day in 2016. Accordingly, the share of dietary energies derived from fats and oil, which constituted 7% in 2000, progressively rose to 8% in 2005, 11% in 2011, and 14% in 2016. This implies that the share of fats and oil as a source of calories is ballooning from time-to-time displacing the share of starchy staples.

However, the average share of dietary energy derived from fats and oils is still far below the recommended level by FAO (2008), which advises the total energy contribution of fats and oils in the range of 20% to 35% of total energy intake. The proportion derived from fats and oils would have increased if other sources, such as poultry, grain, beef and lamb, and eggs, are considered, but it is very unlikely that the average consumption level in urban Ethiopia reaches the minimum recommended level given the exceptionally low level of consumption of these sources as well.

In general, while the amount and the corresponding share of the budget allocated to fats and oil is going down, the total quantities consumed, and the calories derived from fats and oil is rising progressively. This is primarily because of the downward trend in the actual price of fats and oil during the period under consideration. In 2000, a kilogram of fats and oils consumed by average urban Ethiopian costed around 112 Birr which decreased to 67 Birr in 2005, 44 Birr in 2011 and 40 Birr in 2016, all in 2016 constant prices. Similarly, the average cost of 1000 calories derived from fats and oil was standing at 15.04 Birr in 2000 and consistently decreased to 7.87 Birr in 2005, 4.98 Birr in 2011, and 4.55 Birr in 2011, all in 2016 constant prices.

When looking at the consumption pattern of diverse types of edible fats and oils, edible vegetable oil showed massive increase over the period between 2000 and 2016. The increase is in the amount and share of expenditure, quantities, and the amount and share of calories consumed. The average household expenditure on vegetable oil grew from 135 Birr/AE/year in 2000 to 515 Birr/AE/year. This represents an increase of 280% increase in the household budget allocated for vegetable oil. The average quantities of edible oil consumed also spiralled in multiple fold from a mere 1.3kg/AE/year in 2000 to a staggering 15kg/AE/year in 2016. Edible vegetable oil that represented only 2% of the overall dietary calorie consumption in 2000 increased progressively and reached 13% in 2016. The massive shift of household budget and the actual consumption of edible vegetable oil observed during the period under consideration implies households increased reliance on it for their dietary energy displacing the traditional energy sources like starchy staples.

The change in consumption of butter (extracted mainly from cow milk) has been modest, from around 0.5kg/AE/year in 2000 to 0.8kg /AE/year in 2016. During the survey years, the calorie contribution and the share of food budget allocated to butter remained around 1%. This implies that the role of butter, which is considered as the traditional source of fats in Ethiopia, is not keeping pace with the rising consumption of relatively cheaper and more accessible vegetable oil.

The consumption of vegetable butter, hydrogenated vegetable oil that is processed to taste and look like butter, has decreased from 3.6kg/AE/year in 2000 to almost zero in 2016. In 2000, vegetable butter constituted around 6% of the food budget share of households in urban Ethiopia. In the subsequent rounds of HCES, households shifted their budget share from vegetable butter to other sources of fats and oils. The deduction is that hydrogenated vegetable oil with substantial saturated fat and trans-fat content, is losing its popularity in urban Ethiopia and that consumers are replacing it with liquid vegetable oil for consumption. The wider publicity through mainstream and informal media about the cardiometabolic health risks associated with hydrogenated fats might have played a depressing role in the consumption of the product.

Figure 5.17 summarises the progress in terms of the consumption of calories derived from fats and oils over the 16-year period under consideration. It clearly depicts that there has been a profound rightward shift in the log of calories per day derived from fats and oils distribution between 2000 and 2016, confirming that the consumption of fats and oils is progressively increasing from time to time. The weighty and progressive increase in calories derived from fats and oils over time reflects the increasing role of these food groups in shaping the dietary consumption pattern of urban residents of Ethiopia. On the other hand, the expenditure on fats and oils did not increase correspondingly, suggesting that the real prices of fats and oils is getting cheaper.

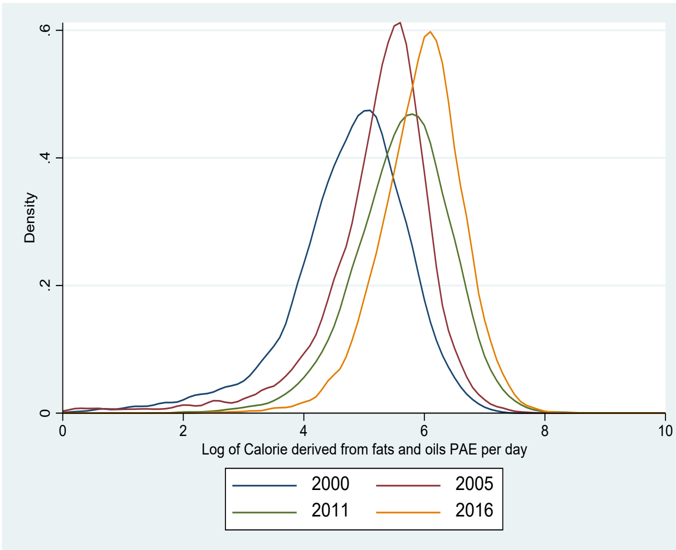

FIGURE 5.17a: DENSITY CURVES DEPICTING THE EVOLUTION OF LOG CALORIES OF FATS AND OILS CONSUMED (KCAL/AE/DAY)

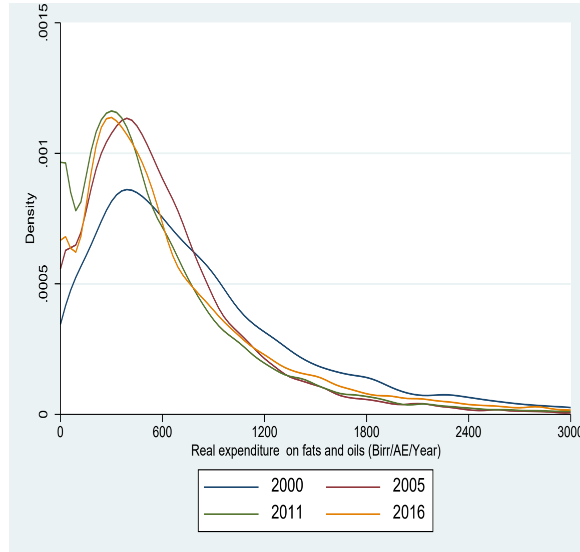

FIGURE 5.17b: DENSITY CURVES DEPICTING THE EVOLUTION OF EXPENDITURE ON FATS AND OILS (BIRR/AE/YEAR)

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.7.2 Consumption of fats and oil by expenditure quintile

Table 5.23 presents the pattern of expenditure, quantities consumed, and calories derived from various sources of fats and oils by expenditure PAE quintiles according to the 2016 HCES data. The two most important sources of fats and oils in urban Ethiopia are vegetable oil and butter, which constituted around 5% to 7% and 0% to 2% of the food budget of urban Ethiopia households. Other sources of fats and oils such as vegetable butter and other fats were not significant across all quintiles. The poor and the rich spend a good share of their income on vegetable oil, suggesting that vegetable oil is important source of fats and oil regardless of income levels of households. The unit price of vegetable oil consumed increases as we move from the poorest to the richest quintile, suggesting that the poorest households tend to consume cheaper vegetable oils (averaging around 32 Birr/kg) while the richer households consume relatively expensive varieties of vegetable oil (averaging around 38 Birr/kg).

Vegetable oil represents around 10% of the dietary energy consumption of the poorest quintile and 15% of the calorie consumption of the richest households. The poorest quintile had an average annual consumption of 12kg/AE/year (which is almost 1kg/AE/month) while households in the richest quintile consume 21kg/AE/year (which is almost 1.75kg/AE/month).

The poorer households spend a tiny share of their food budget to buy butter (a relatively pricey animal source fat) while the richer household tend to spend a larger share of their food budget on this item. The richest quintiles spend 19 times more money on butter than the poorest quintile, three times more than the middle group, and twice as much than the rich (Q4) quintile. The proportion of food budget spent on butter also increases as we move from the poorest to the richest quintile, from zero among the poorest quintile to 2% among the richest quintiles. The annual consumption of butter stood at 1.9kg/AE/year among the richest quintile (Q5), while households in the poorest quintile consume a dismal 0.1kg/AE/year. The number of calories/AE/days derived from butter seems to have linear relationship with expenditure PAE quintiles, suggesting that the households tend to consume butter as their income increases. Compared to other sources of fats and oils, the difference between the richest and the poorest quintile is relatively wide in the consumption of butter.

TABLE 5.22: CONSUMPTION OF FATS AND OIL BY SURVEY YEAR

	BIRR/AE/YEAR								KG/AE/YEAR				CALORIE/AE/DAY							
	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% SHARE	2000	2005	2011	2016	2000	% SHARE	2005	% SHARE	2011	% SHARE	2016	% SHARE
Butter	92	1%	114	2%	95	2%	126	1%	0.5	0.9	1.0	0.8	9	1%	19	1%	21.5	1%	18	1%
Edible vegetable oil	135	2%	409	7%	425	7%	515	6%	1.3	7.2	10.7	15.0	30	2%	165	7%	263.9	10%	369	13%
Other fats	2	0%	3	0%	1	0%	3	0%	0.3	0.0	0.0	0.0	1	0%	0	0%	0.7	0%	0	0%
Vegetable butter	446	6%	11	0%	2	0%	1	0%	3.6	0.2	0.1	0.0	83	5%	3	0%	1.8	0%	0	0%
Total	675	10%	537	9%	523	9%	644	7%	6	8	12	16	123	7%	187	8%	288	11%	388	14%

Source: Own calculation using HCES 2000, 2005, 2011, 2016

TABLE 5.23: CONSUMPTION OF FATS AND OILS BY EXPENDITURE QUINTILE (2016)

	EXPENDITURE (BIRR/AE/YEAR)										QUANTITIES (KG/AE/YEAR)					DIETARY ENERGY (CALORIE/AE/YEAR)									
	Q1		Q2		Q3		Q4		Q5		Q1	Q2	Q3	Q4	Q5	Q1		Q2		Q3		Q4		Q5	
	BIRR	% SHARE	BIRR	% SHARE	BIRR	% SHARE	BIRR	% SHARE	BIRR	% SHARE	KG	KG	KG	KG	KG	CALORIES	% SHARE	CALORIES	% SHARE	CALORIES	% SHARE	CALORIES	% SHARE	CALORIES	% SHARE
Butter	16	0%	42	1%	89	1%	153	1%	310	2%	0.1	0.3	0.6	1.0	1.9	2	0%	7	0%	14	0%	22	1%	42	1%
Edible vegetable oil	250	7%	390	7%	483	6%	597	6%	807	5%	7.8	12.3	14.8	17.8	21.0	191	10%	303	12%	364	13%	436	14%	517	15%
Other fats	1	0%	1	0%	2	0%	2	0%	6	0%	0.0	0.0	0.0	0.0	0.1	0	0%	0	0%	1	0%	0	0%	1	0%
Vegetable butter	0	0%	0	0%	0	0%	0	0%	4	0%	0.0	0.0	0.0	0.0	0.1	0	0%	0	0%	0	0%	0	0%	1	0%
Total	266	8%	433	8%	575	8%	753	7%	1126	7%	7.9	12.7	15.5	18.8	23.1	194	10%	310	12%	378	13%	459	15%	561	16%

Source: Own calculation using HCES 2016

5.7.3 Hot spot spatial analysis of fats and oils consumption

Figure 5.18 shows areas that have hot spots and cold spots of fats and oils consumption in urban Ethiopia. The entire Tigray, Eastern Amhara, most of SNNP, Eastern Somali, and Western Gambella are areas with statistically significant cold spots (95% confidence); areas with low consumption of fats and oils. The result of the analysis shows that Central Amhara, Central Eastern Afar, Diredawa and Harari, Central Oromiya, Northern SNNP, Southern Somali, and Southern Beneshangul Gumuz have hotspot areas, signifying that these are areas of high consumption of fats and oils.

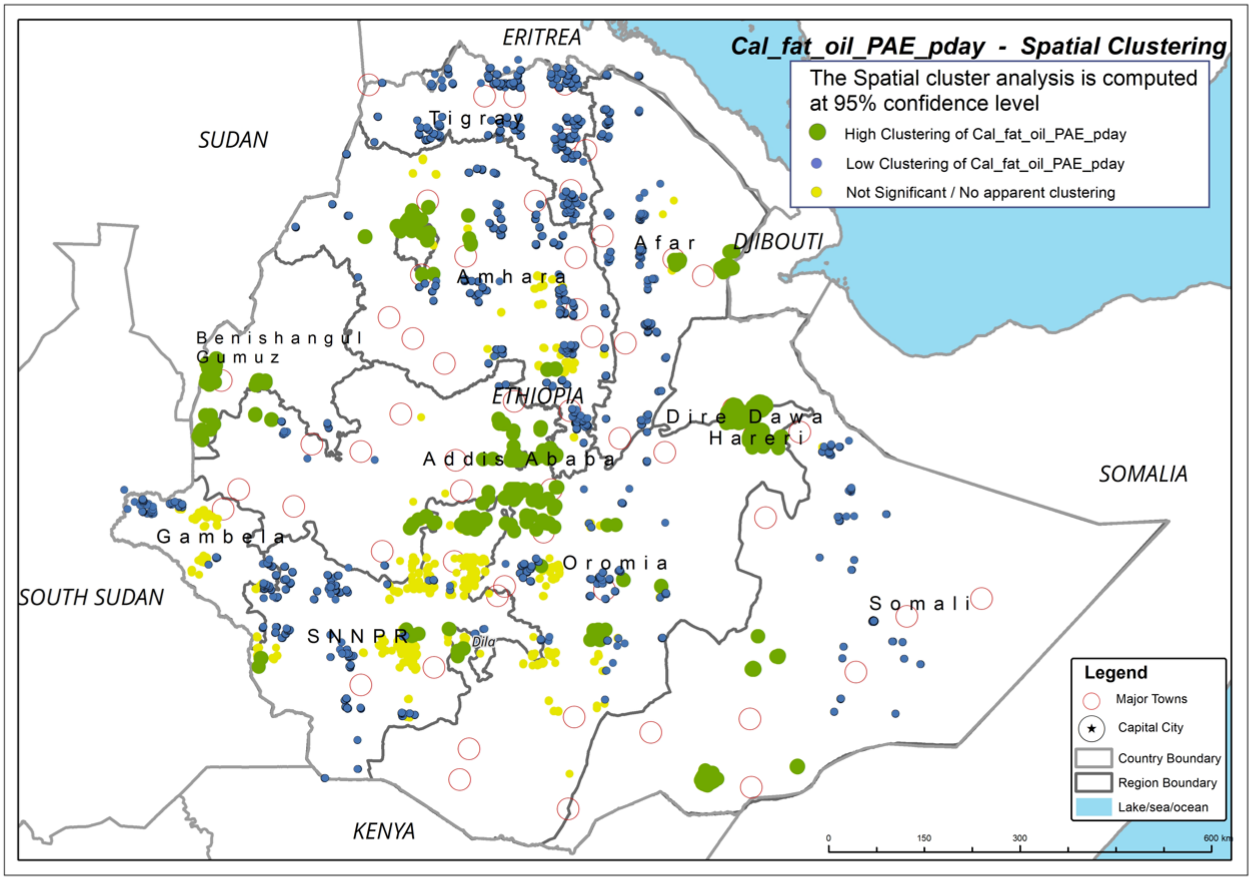

FIGURE 5.18: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF FATS AND OILS CONSUMPTION

Source: Own calculation using HCES 2016

5.7.4 Determinants of the consumption of fats and oils

To identify household level determinants of consumption of fats and oil in urban Ethiopia, two indicators are used. The first model estimates the coefficients of socio-economic and demographic determinants of the log of calorie derived from fats and oil PAE per day. As the distribution of calories derived from fats and oil is markedly skewed, with many small values and a small number of large values, the value of the dependent variable is transformed using natural logarithm. The second model estimates the determinants of percentage of calories derived from fats and oil. The items included in both models as sources of fats and oils include butter, edible vegetable oil, vegetable butter and other fats. GLS regressions models are fitted to find independent predictors that are statistically significant in determining the two indicators. The data from GLS regression for the two models are presented in Table 5.24

After controlling other variables in the model, male headed households consume 73.8 fewer calories/PAE/per day that are derived from fats and oils, signifying that female headed households consume more fats and oils as their sources of dietary energy. Relative to households headed by individuals aged 30 and below (reference), households that have heads in the age range of 31 to 50 and 51 and above are reported to consume 13.2 and 67.7 more calories derived from fats and oils, respectively, indicating households with older heads tend to consume more calories from fats and oil over those that have younger age heads. The proportion of calories derived from fats and oils also increases among households headed by older ages in comparison to those with younger household heads.

This finding is contrary to expectation that stipulates that older people tend to consume lesser quantities of fats and oils than younger people for fear of the health consequences of fats and oils. The mean age of the household has negative relationship with the calories derived. Adult equivalent is positively correlated with the calories derived from fats and oils. A one-unit increase in AE tend to increase the calories derived from dietary fats and oil by 4.7 calories. This may be related to the economies of scale associated with larger household size and thus AE.

Marital status of the household head is another determinant of calorie consumption of households. Compared to households with never married heads (reference), the calories derived from oils and fats were 616 and 150 larger for households headed by individuals who married and no longer married (divorced/ separated/ widowed) groups, respectively. Similarly, married and the longer married categories are reported to have 4% and 2% more calorie share derived from fats and oils as compared to the never married households. This clearly implies the importance of marital life in determining the consumption of oils and fats is substantial in such a way that households that have married household heads on the average tend to consume more calories from fats and oils even after the effects of other variables in the model are held constant. The finding suggests that marital life creates an environment that encourages consumption of fats and oils, whilst the opposite may hold true for households headed by never married. Households that have never married household heads may not have the cooking facilities and time to take care of their dietary consumption properly that might have led to a significantly lower consumption of calories sourced from fats and oils.

As the level of education attained by the household head increases, the number of dietary calories acquired from fats and oils increases, all significant at 0.1% level. Compared to households headed by individuals that do not have any formal education, the average consumption of fats and oils calories increase by 29, 69, and 120 among households that have heads with primary education, secondary education, and tertiary education, respectively. Similarly, holding other factors in the model constant, the share of calories derived from fats and oils increases as the level of education attained by the head of the household advances. This means education has significant fattening effect on the diets of households. The pronounced and significant positive relationship that emerged between level of education attainment and the consumption of fats and oils is likely to be linked to the relatively higher socio-economic status of the educated that may lead to the adoption of consumption pattern dominated by dietary fats and oils.

Expenditure PAE quintile, a proxy to income level category, has discernible effects on the total calories derived from dietary fats and oils. Holding other variables in the model controlled, comparison to the poorest category (Q1), the calories sourced from fats and oils are higher by 93, 133, 149, and 103 for the Q2, Q3, Q4, and Q5, respectively. This implies that as the level of income group progressively rises from the Q1 to Q4 and declines for the richest quintile. The regression coefficients for the percentage share of calories derived from fats and oils also depicts a similar pattern to the previous indicator, that is, progressively increase from the poorest (Q1) to the rich (Q4) and decline in the richest (Q5) category. This means that households' consumption of fats and oils (quantity and share of dietary energy) rises with an increase in income level but drops slightly for the upper 20% segment of households.

This may imply that the richest quintile replaces a portion of dietary energy obtained from fats and oil among the relatively poorer categories with ASF and ultra-processed foods that have relatively higher prices compared to the most commonly consumed fats and oils. These items are more likely to be consumed by the richer households than the poorer ones. In this study, food categories such as beef fats, egg, and mutton, have excessive saturated fats are classified under ASF that may lead to the underrepresentation of fats and oils consumption among the richest categories. Preparing some ultra-processed foods like pizzas, burgers, sandwiches, cakes, cookies, biscuits, and fried dough snacks entails using fats and oil, which is considered under ultra-processed foods rather than under fats and oils. To summarise, the reduction observed in the consumption of fats and oils among the richest category (Q5) may be attributable to the consumption from other sources rather than from the actual reduction of consumption.

Compared to the reference category (Northern towns), Eastern towns do not have statistically significant difference. The households in Central, South, and Southwest Ethiopia and Addis Ababa, on average, consume about 12 calories less and 37 calories more than the reference population. The marginal difference of the regression coefficients suggests that the calories acquired from fats are relatively low compared to the effects of the other predictors like education and quintile. This may mean that the effect of zoning in making a difference of the consumption of fats and oils is relatively small in urban Ethiopia, while a pronounced difference is observed due to other socio-economic and demographic factors.

TABLE 5.24: GLS PARAMETER ESTIMATES OF LOG OF CALORIES (KCAL/AE/DAY) AND PERCENTAGE SHARE OF CALORIE DERIVED FROM FATS AND OILS

	MODEL (1) LOG OF CALORIE DERIVED FROM FATS AND OIL PAE PER DAY	MODEL (2) %AGE SHARE OF CALORIE DERIVED FROM FATS AND OIL
Male	-1.338***(-53.42)	-3.300***(-37.12)
Age		
30 years and below (Ref)	[Ref.]	[Ref.]
31 to 50	0.124***(4.81)	0.0684(0.75)
51 and above	0.517***(13.00)	1.064***(7.54)
Marital status		
Never married (Ref)	[Ref.]	[Ref.]
Married	1.969***(65.91)	4.289***(40.44)
Divorced/ Separated/ Widowed	0.918***(25.31)	1.828***(14.19)
Education category		
No formal education (Ref)	[Ref.]	[Ref.]
Primary school	0.256***(9.16)	1.255***(12.65)
Secondary school	0.524***(19.15)	2.873***(29.58)
Tertiary level	0.790***(23.40)	4.976***(41.50)
Employment sector		
Informal sector (Ref)	[Ref.]	[Ref.]
Formal (Private)	0.110***(4.66)	0.136(1.61)
Public and NGO	0.122***(4.18)	-0.277**(-2.67)
Other	0.0990***(3.82)	0.104(1.14)
Age_mean	-0.0191***(-15.70)	-0.00247(-0.57)
Adultequiv	0.0456***(7.19)	-0.228***(-10.11)
Quintile (Exp PAE)		
Quintile 1 (Poorest) (Ref)	[Ref.]	[Ref.]
Quintile 2	0.658***(22.34)	1.171***(11.19)
Quintile 3	0.847***(28.22)	1.879***(17.64)
Quintile 4	0.911***(29.38)	2.368***(21.52)
Quintile 5 (Richest)	0.709***(21.24)	2.218***(18.73)
Zone		
Northern towns (Ref)	[Ref.]	[Ref.]
Central_S_SW towns	-0.126***(-5.64)	0.0591(0.74)
Eastern towns	0.0461(1.44)	2.196***(19.27)
Addis Ababa	0.318***(12.00)	2.392***(25.41)
_cons	3.475***(63.60)	6.557***(33.81)
N	54069	54069

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using HCES 2000, 2005, 2011, 2016

5.7.5 Blinder-Oaxaca decomposition of fats and oils consumption

The two-fold Blinder–Oaxaca decomposition results indicate that the mean predicted calories derived from fats and oil showed a significant increase between 2000 and 2016, from 166 calories/PAE/day to 434 calories/PAE/day. The decomposition is meant to quantify the contribution of selected covariates in explaining the change in the number of calories derived from fats and oils. The top panel of Table 5.25 depicts that the covariates included in the model explain only 28% of the difference.

The remaining substantial proportion is attributable to the effects of other variables outside the covariates in the model. This may mean that the major factors that are inducing the mean calories consumed from fats and oil are related to factors other than household characteristics. Among others, the substantial portion of the unexplained part might be related to the policy measure introduced by the Government of Ethiopia in 2011 to import and distribute edible oil at subsidized prices. This measure has had a profound effect on the food environment, particularly in relation to the availability and accessibility of cheaper vegetable oil in urban Ethiopia. A pronounced increase in the average calorie obtained from fats and oil is observed among households in the third and fourth quintile while the least change has been witnessed among households in the poorest (Q1) and the richest (Q5) quintiles. This may mean that the consumption of fats and oil moving at a faster pace among the intermediate quintiles and the quintiles at both ends, posted a relatively lower increase in the consumption of fats and oil.

The household characteristics that emerged as the major driver of the change over the period under consideration is change in the real expenditure per adult equivalent that is regarded as a proxy for the level of real income. The change in real expenditure PAE over time explained 14% of the increase in the calorie intake from fats and oil. This is a clear indication suggesting the critical role the change in real income in shaping the consumption pattern of fats and oil in urban Ethiopia. The improved economic wellbeing of the households in the poorest quintile (Q1), as measured by the change in real expenditure PAE, explained 37% of the increase in their calorie intake derived from fats and oils. This result clearly suggests that the economic transformation between 2000 and 2016 among the poorest segment of households in urban Ethiopia has triggered the elevated consumption of fats and oil.

The second most important driver of the increased consumption of calories derived from fats and oils is the change in the composition of the level of education attained by the household heads. The period under consideration witnessed, marked an increase in the proportion of households attaining secondary and tertiary level education and a considerable decline of the proportion of households who did not have any formal education (See Table 5.1). The massive improvement in the level of education of the household heads explained 13% of the upsurge in the consumption of calories derived from fats and oils. Among households in the richest quintile, the shift in the level of education of the household head explained 16% of the increase in the consumption of calories derived from fats and oils. This implies that the role education played in promoting the consumption of fats and oils among households that have a higher level of standard of living is extensive.

Some 6% of the increase in the consumption of calories from fats and oils is explained by the change witnessed in the household size of households. The shift in the composition of the households in terms of patterns in marital status, age, and gender of the household head and percentage of food budget share observed between 2000 and 2016 are significantly associated with the decrease in the consumption of calories derived from fats and oils. The magnitude of association is, however, rather modest.

TABLE 5.25: BLINDER-OAXACA DECOMPOSITION OF THE DIFFERENCE IN THE CALORIES DERIVED FROM FATS AND OILS CONSUMED BETWEEN 2000 AND 2016 BY EXPENDITURE PAE QUINTILE (OVERALL AND EXPLAINED COMPONENT)

	(1) ALL	(2) QUINTILE 1(POORES T)	(3) QUINTILE 2 (POOR)	(4) QUINTILE 3 (MEDIUM)	(5) QUINTILE 4 (RICH)	(6) QUINTILE 5 (RICHEST)
group_1=2016	433.8*** (2.409)	241.9*** (2.758)	373.5*** (3.355)	443.7*** (4.151)	514.5*** (5.483)	582.9*** (7.721)
group_2=2000	166.2*** (1.599)	46.42*** (0.917)	87.74*** (1.230)	129.8*** (1.621)	193.5*** (2.219)	329.3*** (4.436)
difference	267.6*** (2.891)	195.5*** (2.906)	285.8*** (3.574)	313.8*** (4.457)	321.0*** (5.915)	253.6*** (8.904)
explained	75.77*** (2.722)	68.81*** (4.141)	69.97*** (11.34)	102.3*** (15.09)	121.8*** (16.86)	77.63*** (9.234)
unexplained	191.8*** (3.112)	126.7*** (4.102)	215.8*** (11.54)	211.6*** (15.14)	199.2*** (17.06)	176.0*** (10.69)
explained						
Male	-3.107*** (0.869)	-0.113 (0.160)	-0.0986 (0.464)	-2.429* (1.123)	-6.108** (1.952)	-5.774 (4.235)
Age	-1.777** (0.684)	0.663 (0.634)	-1.211 (0.880)	-3.449 (1.812)	-5.154** (1.986)	-10.52*** (2.836)
real_exp_PAE	38.31*** (2.300)	73.09*** (3.202)	70.44*** (11.05)	86.13*** (14.81)	95.03*** (16.59)	39.66*** (6.786)
Age_mean	0.0229 (0.132)	0.0225 (0.267)	-0.254 (0.395)	-0.549 (0.422)	-0.374 (0.434)	-0.572 (0.632)
hh_size	17.01*** (0.964)	2.726*** (0.643)	7.524*** (1.295)	14.95*** (1.775)	17.70*** (2.213)	17.02*** (3.372)
educ	34.12*** (1.772)	10.98*** (2.676)	13.38*** (2.982)	22.25*** (2.999)	30.14*** (3.646)	39.76*** (4.344)
emp	0.292 (1.411)	0.750 (1.524)	-3.685 (2.243)	-1.102 (2.355)	3.536 (3.040)	4.332 (4.330)
marit	-4.396*** (1.064)	-1.138 (0.679)	-1.737 (0.892)	-4.303* (1.964)	-8.302** (2.619)	-8.173* (3.611)
pct_food_exp	-4.698*** (0.581)	-18.16*** (1.709)	-14.38*** (1.579)	-9.195*** (1.450)	-4.686*** (1.036)	1.900 (1.352)
N	28460	5245	5558	5828	5890	5938

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: the explanatory variables are Male (male headed households), Age (Age of the household head), real_exp_PAE (real expenditure per adult equivalent), Age_mean (mean ae of the household), hh_size (household size), educ (level of education of the household head), emp (employment of the household head), marit (marital status of the household head), pct_food_exp (percentage share of expenditure on food).

Source: Own calculation using HCES 2000 and 2016

5.8 PATTERNS, TRENDS, AND DETERMINANTS OF OVERWEIGHT AND OBESITY IN URBAN ETHIOPIA

The nutrition transition model posits that developing countries are increasingly shifting from traditional diets that are dominated by cereals and fibre to diets high in sugars, fat, and animal-sources. The dietary transformation of urban Ethiopia has been dealt with in the previous sections of this chapter. The model further indicates that the dietary shift is accompanied with an increase in the prevalence of overweight-obesity and other nutrition-related NCDs, such as diabetes, hypertension, other aspects of coronary heart disease, and 13 of the 15 major cancers (Popkin & Ng 2021). In this section, the patterns of change, trends, and determinants of overweight and obesity in urban Ethiopia are examined to explore whether dietary transformation is accompanied by a change in the incidence of overweight/obesity in accordance with the patterns suggested in nutrition transition.

Because women and men may have different risk levels for overweight/obesity incidence, the analysis in this section is conducted for the two groups separately. For the women's group, the EDHS conducted in 2000, 2005, 2011, and 2016 are used as data sources for the analysis in this section. Anthropometric data were not collected for men in the first two rounds of DHS (2000 and 2005). Hence, the analysis for men was carried out using the data collected in 2011 and 2016. The overlap of the survey years of HCES and DHS in Ethiopia enables us to explore the patterns of change in the dietary shift and overweight obesity in the specific years.

5.8.1 Characteristics of the study population

Table 5.26 presents the socio-economic and demographic characteristics of women and men in urban Ethiopia covered by the Ethiopian Demographic and Health Surveys carried out in 2000, 2005, 2011, and 2016. The age of women and men in the younger age group (15-24) tended to contract, while the proportion of men and women in the medium age group of 25 to 34 ballooned in recent survey years, signifying the demographic transition taking place in urban Ethiopia. The proportion of women and men without formal education decreased, while the share of women and men who attained higher education rose substantially during the inter-survey periods. The proportion of men and men watching television frequently increased over time, while the proportion owning a car/truck showed little variability across the survey years. Regarding occupation, the proportion of men and women engaged in manual work decreased while the share of those engaged in professional, technical, and managerial and other jobs exhibited an increase over the period under consideration.

TABLE 5.26: CHARACTERISTICS OF THE STUDY POPULATION

INDEPENDENT VARIABLES	WOMEN				MEN	
	2000	2005	2011	2016	2011	2016
Age group						
15-24	48.7%	49.7%	47.6%	42.2%	39.5%	35.6%
25-34	28.7%	27.0%	31.7%	35.1%	29.0%	32.9%
35-49	22.7%	23.3%	20.7%	22.7%	24.6%	23.6%
50-59					6.9%	7.9%
Current marital status						
Never married	39.8%	45.5%	40.4%	39.5%	49.4%	48.9%
Married/Living together	42.7%	38.4%	46.7%	47.7%	46.7%	48.3%
Widowed/divorced/ not living together	17.4%	16.1%	12.9%	12.8%	3.9%	2.8%
Current use of hormonal contraceptives	11.8%	16.4%	22.1%	21.3%		
Level of education						
No education	36%	25%	22%	16%	9.7%	8.5%
Primary	23%	24%	43%	33%	42.1%	28.3%
Secondary	38%	44%	20%	29%	25.2%	30.4%
Higher	2%	7%	15%	21%	23.0%	32.8%
Religion						
Orthodox	65%	73%	65%	60%	64.6%	59.2%
Muslim	22%	14%	18%	19%	19.8%	19.9%
Protestant and others	13%	13%	17%	21%	15.6%	20.8%
Has car/truck	3%	5%	5%	5%	3.8%	3.4%
Frequency of watching television						
Not at all	48%	29%	21%	22%	10.8%	15.8%
Less than once a week	30%	32%	31%	17%	29.5%	19.3%
At least once a week	22%	39%	48%	61%	59.7%	64.9%
Occupation						

INDEPENDENT VARIABLES	WOMEN				MEN	
	2000	2005	2011	2016	2011	2016
Unemployed	43.6%	56.8%	42.6%	38.5%	13.4%	14.5%
Professional, technical, managerial	2.6%	6.2%	5.3%	8.0%	11.5%	16.9%
Sales	27.2%	24.4%	26.5%	27.8%	22.0%	13.0%
Manual (Skilled, unskilled, agriculture)	20.3%	9.7%	16.8%	11.4%	42.3%	40.9%
Other	6.4%	3.0%	8.7%	14.4%	10.8%	14.7%
Region						
Tigray	9%	8%	8%	8%	6.8%	6.9%
Afar	1%	1%	1%	1%	1.2%	1.2%
Amhara	17%	16%	24%	21%	24.2%	23.0%
Oromiya	33%	30%	24%	25%	24.5%	26.2%
Somali	2%	3%	4%	2%	2.9%	2.9%
Ben-Gumz	1%	1%	1%	1%	1.1%	0.7%
SNNP	10%	8%	14%	12%	12.9%	11.5%
Gambela	0%	0%	1%	1%	0.6%	0.7%
Harari	1%	1%	1%	1%	0.8%	0.6%
Addis Ababa	25%	30%	23%	27%	23.7%	24.4%
Dire Dawa	2%	2%	1%	2%	1.3%	1.9%

Source: Own calculation using EDHS 2000, 2005, 2011, and 2016

5.8.2 Patterns and trends in prevalence of overweight and obesity in urban Ethiopia

Figure 5.19a presents the trends of the nutritional status of non-pregnant and non-postpartum (first two months after delivery) women aged 15 to 49 years. These groups are excluded from the analysis primarily because pregnant women naturally gain weight during their pregnancy and post-partum women usually retain weight from pregnancy. The trends of the prevalence of overweight and obesity nearly doubled from some 12% in 2000 to 22% in 2016. The proportion of obese women, which stood at 2% in 2000, rose to 6% in 2016. For men in the age range of 15 to 59 years, the prevalence of overweight and obesity was relatively lower in comparison with that of women. Between 2011 and 2016, the prevalence of overweight surged from 7% to 11%, while the prevalence of obesity increased from 1% to 2%.

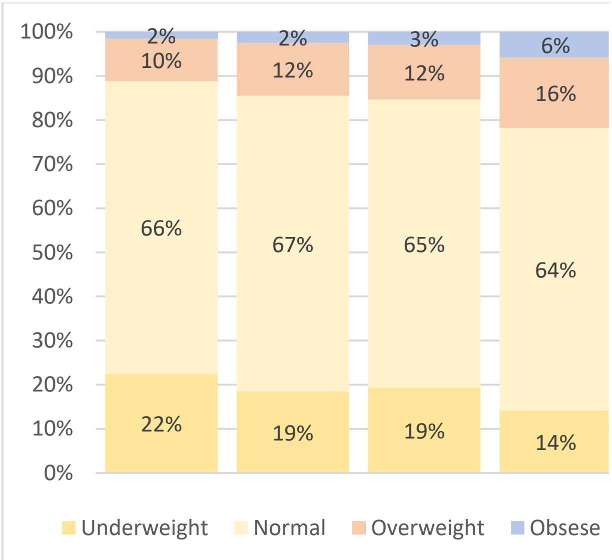

FIGURE 5.19a: TRENDS OF NUTRITIONAL STATUS OF ADULT WOMEN (15-49) IN URBAN ETHIOPIA

Source: Own computation using EDHS 2000, 2005, 2011, and 2016

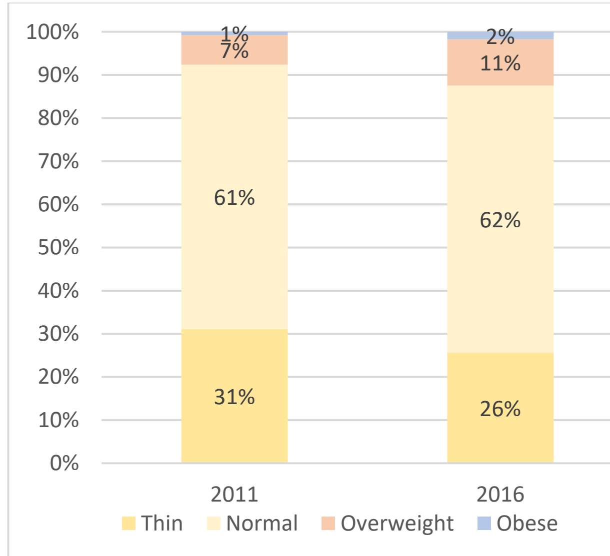

FIGURE 5.19b: TRENDS OF NUTRITIONAL STATUS OF ADULT MEN (15-59) IN URBAN ETHIOPIA

Source: Own computation using EDHS 2011 and 2016

Figure 5.20 presents a five-year moving average BMI by age of the women and survey year. The mean BMI of women by single age was smoothened by a five-year moving average to mitigate random and short-term fluctuations. The smoothened mean BMI of 2016 remained at the highest levels between the age ranges of 22 and 43 years. The year 2000 exhibited the least mean BMI throughout almost all ages of the women, suggesting that mean BMI exhibited an increase in the subsequent survey years across all ages.

The five-year moving average BMI of women in 2005 and 2011, nearly overlapped in the early to mid-reproductive ages (between 19 and 35 years of age), and the latter exceeded between 35 and 44 years. The mean BMI across the survey years, tended to converge or exhibited slight differences during the early ages of women between 20 and 25 years. Overall, the graph indicates that the mean BMI of women generally increased during the 16-year period of 2000 to 2016, particularly during the age ranges between 25 and 49 years. In almost all the survey years, the mean BMI remained at the lowest levels during the early reproductive ages of women (19 to 25 years) and rose steadily until the midforties and then moved downwards during the late reproductive ages of women (45 to 49 years).

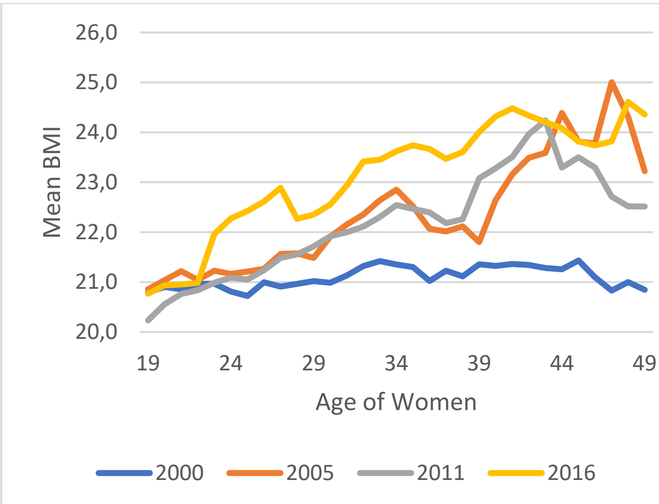

FIGURE 5.20a: FIVE-YEAR MOVING AVERAGE BMI BY AGE OF THE WOMEN AND SURVEY YEAR

Source: Own computation using EDHS 2000, 2005, 2011, and 2016

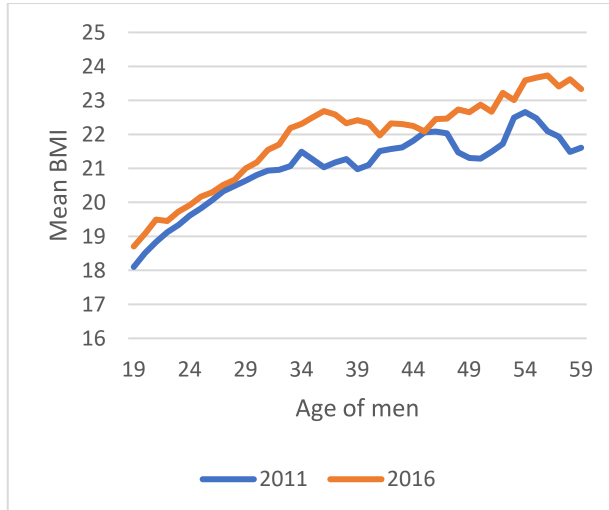

FIGURE 5.20b: FIVE-YEAR MOVING AVERAGE BMI BY AGE OF THE MEN AND SURVEY YEAR

Source: Own calculation using EDHS 2011 and 2016

Figure 5.19a depicts the five-year moving average BMI of the men for the years 2011 and 2016. In both 2011 and 2016, the mean BMI of men increased steadily in the age ranges between 19 years and mid-30s. The ensuing ages until the mid-40s exhibited mixed trends of the mean BMI. In 2016, the mean BMI exhibited an overall upward tendency until the late 50s. Compared to the year 2011, the mean BMI values of men witnessed an increase in all ages, implying the increasing body weight of men in urban Ethiopia.

The distributional pattern of BMI of women were non-parametrically estimated using density curves. As reflected in Figure 5.21, all the survey years had unimodal curves with all the modes falling within the normal BMI category. The BMI distribution in 2016 dominated the previous survey years significantly starting from the later ranges of normal BMI (23 to 25) and in the overweight and obesity categories. This clearly implies that urban Ethiopian women in the reproductive ages were increasingly moving to the overweight and obese categories while the proportion of underweight and normal was shrinking. The density curve for the year 2000 was located to the left of the curves in almost all categories, suggesting that it represented the largest share of undernutrition and the smallest share of women that were overweight/obesity compared to the subsequent survey years. There is no clear pattern regarding to the distribution of women's BMI in 2005 and 2011, as the curves were interlocked in these years.

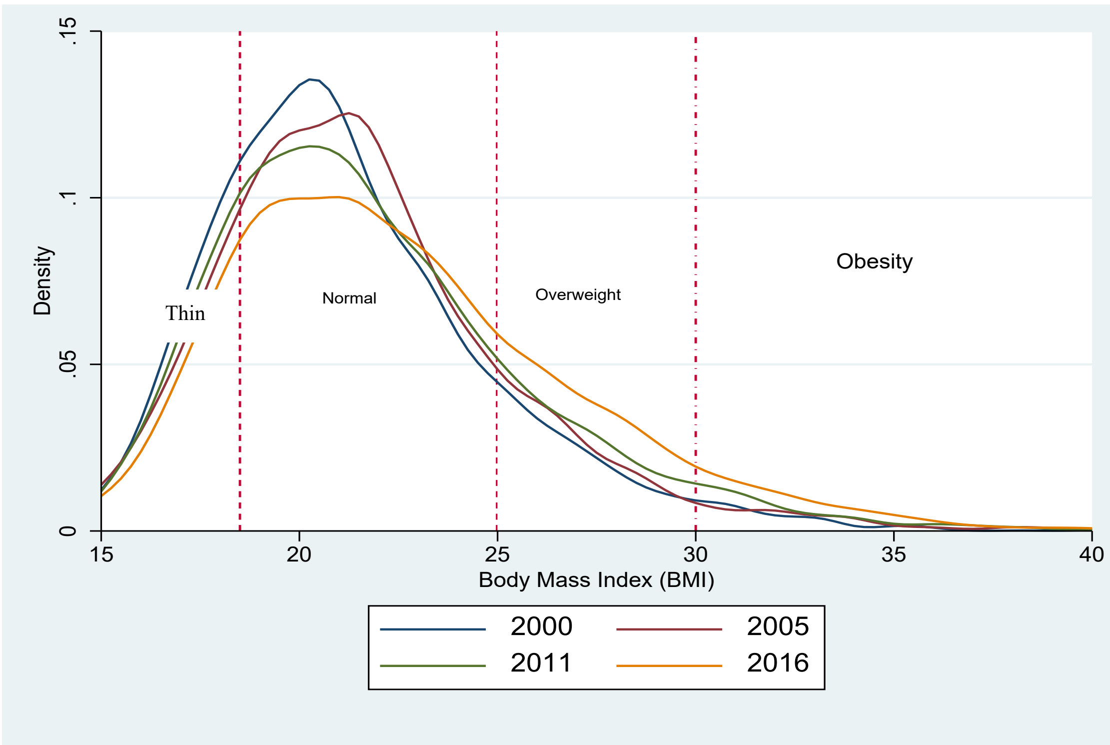

FIGURE 5.21: DENSITY CURVES DEPICTING THE EVOLUTION OF BMI DISTRIBUTION OF WOMEN IN URBAN ETHIOPIA (2000 TO 2016)

Source: Own computation using EDHS 2000, 2005, 2011, and 2016

Figure 5.22 shows the density curves of the BMI distribution of men in urban Ethiopia in 2011 and 2016. The proportion of men with a BMI in the thin and lower normal categories diminished between 2011 and 2016. On the other hand, the expansion of the 2016 curve to the right implies the ballooning of the proportion of overweight and obese men in urban Ethiopia, between 2011 and 2016.

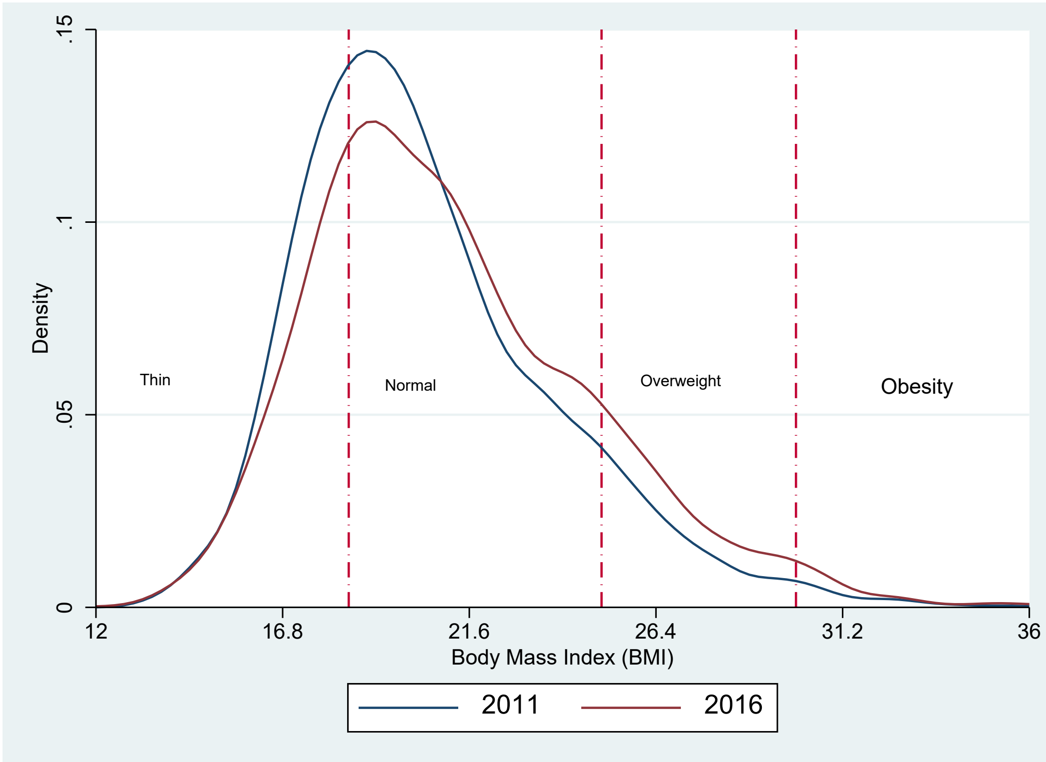

FIGURE 5.22: DENSITY CURVES DEPICTING THE EVOLUTION OF THE BMI DISTRIBUTION OF MEN IN URBAN ETHIOPIA (2011 AND 2016)

Source Own computation using EDHS 2011 and 2016

5.8.3 Prevalence of overweight/obesity across wealth quintile groups

In DHS, it is the standard procedure to collect country-specific asset ownership, housing characteristics, and water and sanitation facilities, which are used to compute the household wealth index by assigning a weight for each item, using the principal components analysis method. Households are categorised into quintile groups based on the index generated for each household. Conducting an analysis by applying the quintile groups provided by DHS was not practical as it included all the individuals and households in the entire country (urban and rural). Because this study focused exclusively on urban Ethiopia, a new quintile classification was carried out exclusively for urban men and women in each survey year according to the wealth indices calculated by the DHS. Table 5.27 presents the prevalence of overweight (BMI between 25 to 24.99) and obesity (BMI above or equal to 30) of men and women based on their wealth index quintile. Overweight and obesity were combined as one category to ensure enough cases for the analysis.

In almost all the survey years, the likelihood of being overweight or obese consistently increased as the quintile increased from the lowest to the highest, implying that overweight and obesity were positively associated with wealth. Standing at 370%, the gap between the lowest and the highest quintile women was relatively wide in 2016. Between 2000 and 2016, the prevalence of overweight and obesity consistently increased in almost all the wealth quintiles, with the fourth quintile registering the relatively highest change (105%) over the 16-year period. The deduction was that the increase in the prevalence of overweight and obesity in urban Ethiopia was witnessed among the poor and the rich, albeit that a substantial shift took place, particularly among women in the fourth quintile. In other words, increasing numbers of women joined the overweight/obese group from the fourth quintile than the other quintiles over the different surveys.

Women were more likely to be overweight or obese compared to their male counterparts in all the survey years and wealth quintile groups. The gap between men and women in terms of the prevalence of overweight and obesity was relatively wide among the lowest wealth quintile (Q1) and generally decreased with the increase to the highest quintile. For example, in 2016, women in the poorest quintile were more than three times more likely to be overweight or obese as compared to men in a similar wealth group, while the gap narrowed down to just 1.2 times among the highest quintiles.

TABLE 5.27: PREVALENCE OF OVERWEIGHT AND OBESITY AMONG URBAN WOMEN AND MEN BY WEALTH QUINTILE AND SURVEY YEAR

WEALTH INDEX QUINTILE	WOMEN (15-49)				MEN (15-59)	
	2000	2005	2011	2016	2011	2016
Quintile 1 (Lowest)	5.3%	7.5%	7.2%	7.7%	1.6%	2.5%
Quintile 2 (Second)	10.3%	12.6%	11.1%	19.5%	2.8%	12.3%
Quintile 3 (Middle)	15.9%	17.4%	18.4%	23.8%	9.4%	13.2%
Quintile 4 (Fourth)	15.9%	22.9%	24.5%	32.6%	16.8%	20.0%
Quintile 5 (Highest)	22.7%	21.3%	29.2%	36.2%	23.4%	29.7%
Total	11.2%	14.2%	14.9%	21.4%	8.3%	13.7%

Source: Own calculation using EDHS 2000, 2005, 2011, and 2016

5.8.4 Hot spot spatial analysis of overweight and obesity in urban Ethiopia

Figure 5.23a to Figure 5.23f display the results of the hot spot analysis of clustering of the incidence of overweight and obesity among women (2000, 2005, 2011, and 2016) and men (2011 and 2016) performed using the Getis-Ord Gi* statistical test. Areas around Addis Ababa, Diredawa, and Harari emerged as clusters of hot spots of overweight and obesity, in almost all the survey years for both men and women. The results from across the survey years consistently suggested that there was a significant contagious clustering of the prevalence of overweight/obesity around these urban centres, significant at the 95% confidence level. These were areas that were relatively urbanised with westernised food systems and where occupations and travel required less physical activity. As indicated in the previous sections, these areas were hot spots for the consumption of ASF, fruit and vegetables, refined cereals (in Diredawa and Harari), UPF, fats and oils.

The Figures show that there are no other places that have apparent hot spots and cold spots for overweight/obesity across the survey years and between the genders.

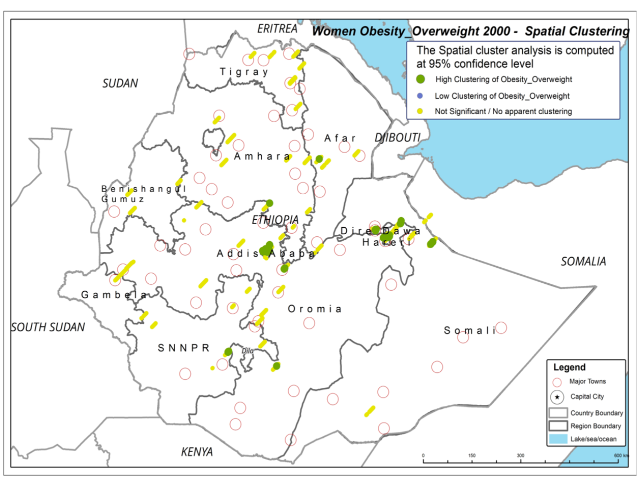

FIGURE 5.22a: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF THE PREVALENCE OF OVERWEIGHT/OBESITY AMONG WOMEN IN 2000

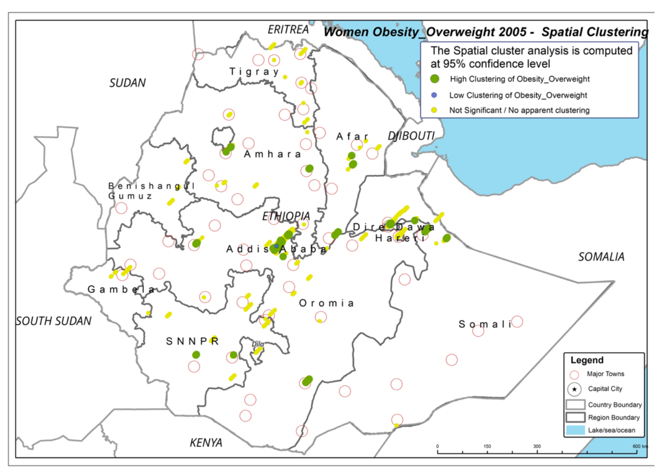

FIGURE 5.22b: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF THE PREVALENCE OF OVERWEIGHT/OBESITY AMONG WOMEN IN 2005

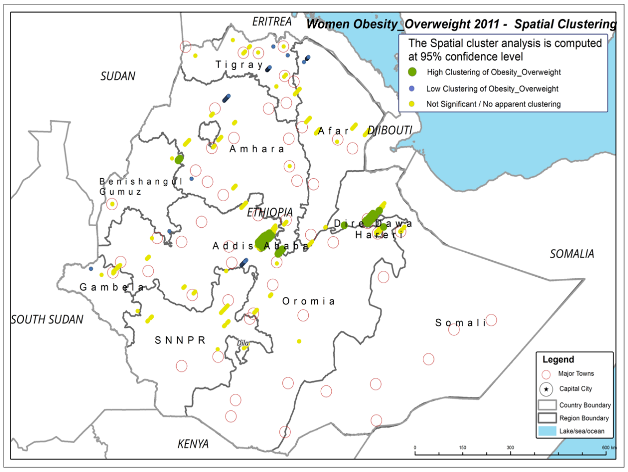

FIGURE 5.22c: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF THE PREVALENCE OF OVERWEIGHT/OBESITY AMONG WOMEN IN 2011

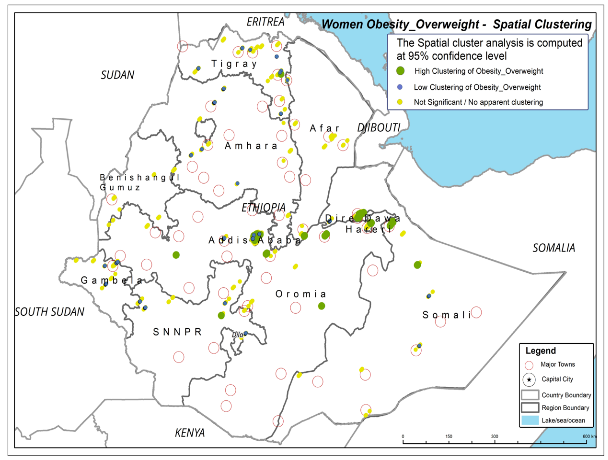

FIGURE 5.22d: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF THE PREVALENCE OF OVERWEIGHT/OBESITY AMONG WOMEN IN 2016

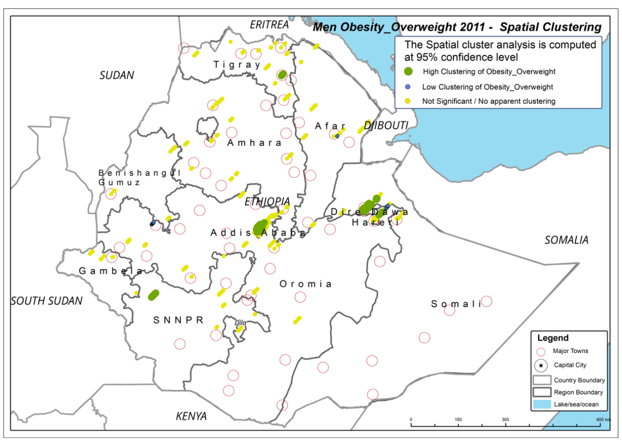

FIGURE 5.22e: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF THE PREVALENCE OF OVERWEIGHT/OBESITY AMONG MEN IN 2011

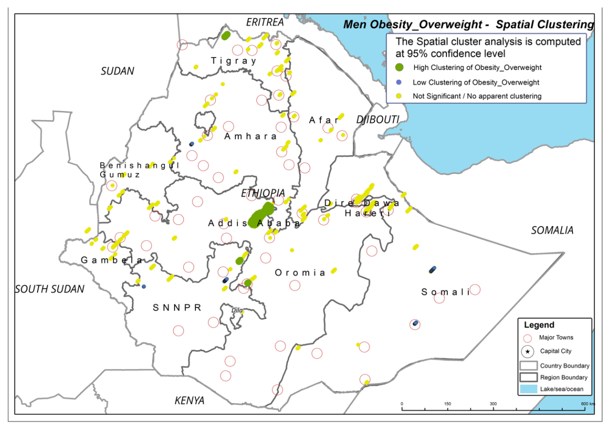

FIGURE 5.22f: SPATIAL HOT SPOT AND COLD SPOT DETECTION OF THE PREVALENCE OF OVERWEIGHT/OBESITY AMONG MEN IN 2016

Source Own computation using EDHS 2000, 2005, 2011, and 2016.

5.8.5 Determinants of overweight and obesity in urban Ethiopia

Table 5.28 presents the probit estimates of socio-economic and demographic covariates associated with being overweight/obese and their marginal effects computed from the pooled women DHS data of 2000, 2005, 2011, and 2016. The age of women was a positive predictor of the probability of being overweight/obese. As suggested by the marginal effect estimation, women in urban Ethiopia have a 2.4% increased chance of being overweight/obese for every unit increase in age when all the predictors included in the model were at their mean values. As implied by the negative sign of age-squared, the relationship between the age of women and the probability of being overweight/obese is not linear. The pattern of marginal effects in Figure 5.23 confirms the nonlinearity in the probability of being overweight/obese at different ages of women.

The marginal effect of the probit model estimates indicated that never-married women had a lower probability of being overweight/obese. Compared to never-married women, married women have a 7% increased predicted probability of being overweight/obese. The predicted probability of being overweight increased by 3% if a woman was divorced/widowed/separated.

Marginal effect results from the probit model suggested that compared to Orthodox Christian women, Muslim women have a 4.6% higher probability of being overweight/obese. On the other hand, women in Protestant and other religion groups did not have a statistically significant different predicted the probability of being overweight/obese compared to the reference category (Orthodox Christians).

These results implied that the type of jobs women engaged in had a significant effect on the chance of being overweight/obese. The probability of being overweight/obese for women engaged in professional/technical/managerial jobs increased by 3.7% as compared to the unemployed, holding all else equal, with this result being significant at the 1% alpha level. Women that do manual jobs in the skilled, unskilled, or agricultural sectors had a smaller probability of being overweight/obese compared to women who were unemployed. Women who were engaged in sales jobs did not have a statistically significant predicted probability of being overweight/obese compared to the base population of unemployed women. The results, in general, indicate that overweight/obesity was a relatively common phenomenon among women who were engaged in less manually labour-intensive professional jobs, while women engaged in labour-intensive activities had a relatively lower chance of being overweight/obese.

The increased frequency of watching television and the ownership of a car/truck were significant predictors of the probability of being overweight/obese. Women that were watching television at least once a week and those owning a car/truck had an increased predicted probability of being overweight/obese. The increased frequency of watching television is associated with sedentary leisure time while the ownership of a motorised vehicle may be associated with physical inactivity because people no longer walked or cycled for long distances and this in turn could contribute to the increased chance of being overweight/obese.

The probit estimates implied that the relationship between the level of education of women and the probability of being overweight/obese appeared to be non-linear. For women who had received a primary and secondary education, the probability of being overweight/obese increases by 2.4% and 2.9%, respectively, compared to those without any education, holding all else equal, with this result being significant at the 1% alpha level. The probit coefficient and the marginal effect result indicated that attending post-secondary education did not have significant effect on the probability of women in urban Ethiopia to be overweight/obese. This may imply that women having advanced level education may have an increased level of knowledge and awareness concerning the health risks associated with unhealthy lifestyles that may lead them to take practical steps to prevent/mitigate overweight/obesity.

From the FGDs conducted for this study, some women associated their weight gain with the use of hormone-based contraceptives, rather than with the types or amounts of food they ate, or any lack of physical activity. The probit model results suggested that women who were taking hormone-based contraceptives (such as the contraceptive pill, IUD, injections, and Norplant) at the time of the survey did not have any statistically significant greater predicted probability of being overweight/obese compared to those who did not use such contraceptives, although the coefficient was positive. Similarly, the number of children ever born did not have a significant effect on the chance of women being overweight/obese.

As suggested by the magnitudes of the coefficients and the level of significance, the wealth index quintile of women was noted to have a pronounced effect on the probability of women in urban Ethiopia to be overweight/obese. The predicted probability of being overweight/ obese increased progressively as the wealth index level of women increased from the lowest (poorest) to the highest (affluent) quintiles. Compared to the reference population (Q1), the probability of being overweight/obese among second, medium, fourth, and highest quintiles increased by 7%, 9%, 14%, and 17%, respectively. This may be because women tended to increase their total calorie consumption and become less active as they became more affluent.

The marginal effect coefficients for the survey year reaffirmed the earlier claim that women in urban Ethiopia were becoming increasingly heavier over time. Compared to the base year (2000), the probability of women to be overweight/obese increases by 2% (although the result was not statistically insignificant at the 5% alpha level), 3%, and 9% in 2005, 2011, and 2016, respectively.

TABLE 5.28: PROBIT ESTIMATES AND THEIR MARGINAL EFFECTS OF FACTORS AFFECTING OVERWEIGHT AND OBESITY AMONG WOMEN IN URBAN ETHIOPIA (POOLED DATA)

	(1) PROBIT COEFFICIENT	(2) MARGINAL EFFECT (dy/dx)
Age	0.103^{***}(9.46)	0.0241^{***}(9.49)
Age squared	-0.00102^{***}(-6.08)	-0.000239^{***}(-6.08)
Marital Status		
Never married (Reference)	[Ref.]	[Ref.]
Married and living together	0.315^{***}(7.70)	0.0740^{***}(7.75)
Widowed/divorced/ not living together	0.143^{**}(3.07)	0.0313^{**}(3.02)
Religion		
Orthodox (ref)	[Ref.]	[Ref.]
Muslim	0.189^{***}(6.11)	0.0455^{***}(5.97)
Protestant and others	0.0218(0.54)	0.00492(0.53)
Occupation		
Unemployed (Reference)	[Ref.]	[Ref.]
Professional, technical, managerial	0.151^{**}(2.59)	0.0372^{*}(2.49)

	(1) PROBIT COEFFICIENT	(2) MARGINAL EFFECT (dy/dx)
Sales	0.0190(0.62)	0.00446(0.62)
Manual (Skilled, unskilled, agriculture)	-0.141**(-3.19)	-0.0311***(-3.30)
Other	0.0941*(2.06)	0.0227*(2.01)
Frequency of watching television		
Not at all (Reference)	[Ref.]	[Ref.]
Less than once a week	0.168***(4.09)	0.0376***(4.15)
At least once a week	0.200***(4.89)	0.0452***(5.04)
Ownership of Car/truck		
No (Reference)	[Ref.]	[Ref.]
Yes	0.210***(4.05)	0.0524***(3.81)
Level of Education		
No education (Reference)	[Ref.]	[Ref.]
Primary	0.107**(2.84)	0.0246**(2.88)
Secondary	0.128**(3.12)	0.0296**(3.15)
Higher	-0.00272(-0.05)	-0.000600(-0.05)
Number of children ever born	0.00852(0.65)	0.00199(0.65)
Use of hormonal contraceptives		
No (Reference)	[Ref.]	[Ref.]
Yes	0.0141(0.40)	0.00330(0.39)
Wealth Index quintile		
Quintile1 (Lowest) (Reference)	[Ref.]	[Ref.]
Quintile 2 (Second)	0.351***(7.64)	0.0656***(7.83)
Quintile 3 (Medium)	0.444***(9.32)	0.0868***(9.64)
Quintile 4 (Fourth)	0.644***(13.21)	0.138***(13.84)
Quintile 5 (Highest)	0.755***(14.45)	0.169***(14.82)
Survey Year		
2000 (Reference)	[Ref.]	[Ref.]
2005	0.0735(1.66)	0.0156(1.64)
2011	0.148***(4.15)	0.0324***(4.18)
2016	0.364***(10.25)	0.0868***(10.37)
_cons	-4.024***(-25.01)	
N	15768	15768

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using EDHS 2000, 2005, 2011, and 2016

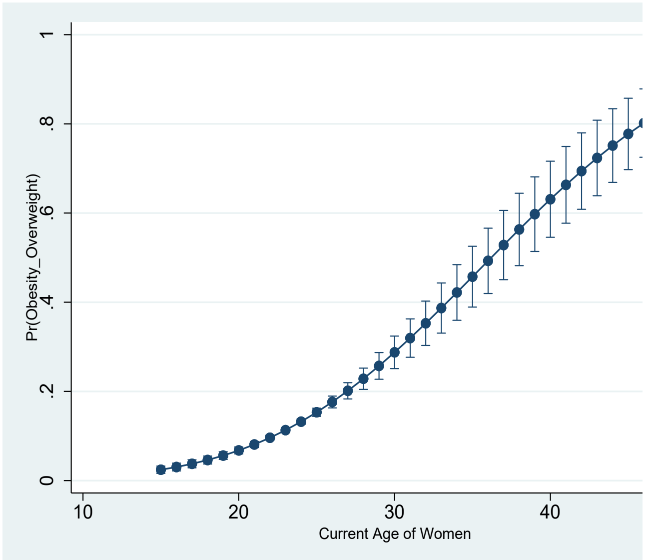

FIGURE 5.23a: MARGINAL EFFECTS OF AGE OF WOMEN ON THE PROBABILITY OF BEING OVERWEIGHT/OBESE (WITH 95% CI)

Source: Own calculation using EDHS 2000, 2005, 2011, and 2016

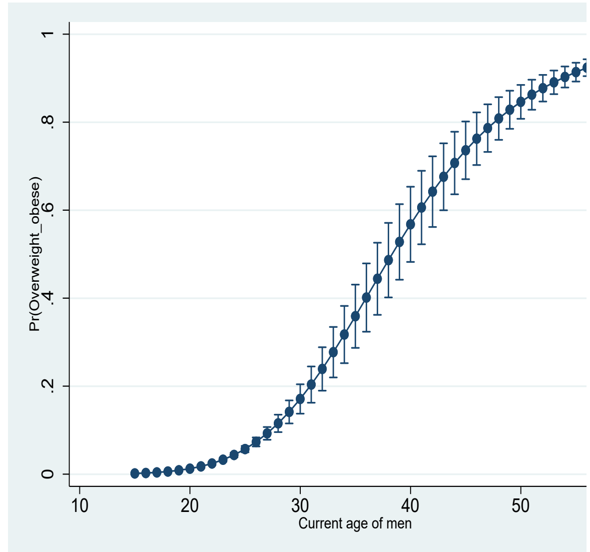

FIGURE 5.23b: MARGINAL EFFECTS OF AGE OF MEN ON THE PROBABILITY OF BEING OVERWEIGHT/OBESE (WITH 95% CI)

Source: Own calculation using EDHS 2011 and 2016

The probit estimates and the marginal effects of the determinants of overweight/obesity among adult men in urban Ethiopia are presented in Table 5.29. The EDHS men data from 2011 and 2016 were pooled and important socio-economic and demographic variables of the individuals (age, age-squared, marital status, religion, occupation, frequency of watching television, ownership of car, level of education) and the characteristics of their households (ownership of car/truck and wealth index quintile) were fitted into the probit regression model to identify the determinants of overweight and obesity. The estimated probit model was used to assess the marginal effects of numerous factors on the probability of becoming overweight/obese.

For every one-year increase in the age of the respondent men the probability of being overweight/obese increased by 3%, although the negative sign of age squared coefficient indicated a likely quadratic effect on the likelihood of becoming overweight and obese. This is further implied in the Figure 5.23b that depicts marginal effects of age of men on the probability of being overweight/obese (with 95% CI). Being married is associated with a 4% higher probability of being overweight/obese as compared to never-married men. Men who attained secondary level education have a 6% more probability of being overweight/obese than the base group of no education. The corresponding effect for men who attained tertiary education is 7%. The latter is contrary to the results observed among the women group where post-secondary education does not have a significant effect on the chance of being overweight/obese. This may indicate that attaining tertiary level education may not have the behavioural effect in suppressing the probability of having overweight/obese nutritional status among men.

Ownership of a car/truck increases the probability of being overweight/obese by almost 7%, whereas frequency of watching television does not have a statistically significant effect at the 5% level. Similarly, the occupation categories do not have a statistically significant effect at the 5% level except for men engaged in sales activities, with an estimated marginal effect of 6% compared to the reference group, unemployed men. This may imply that, on average, the increased chance of being overweight/obese among men is not significantly determined by the type of occupation they are engaged in. As seen in the women group, the difference in the wealth index quintile significantly affects the likelihood of men being overweight/obese.

On average, being in the second (Q2) and medium (Q3) wealth index quintiles is associated with 4% and 8% increased probability of being overweight/obese as compared to the reference category, the poorest quintile (Q1). The probability further increases to 13% among men in the fourth quintile and 16% in the wealthiest quintile. This clearly implies that the increased wealth level of men, as proxied by the wealth index quintiles, has a substantially positive effect on increasing the likelihood of being overweight/obese. This may, at least partly, be attributable to the increased access and consumption of foods and a sedentary lifestyle as individuals are getting richer. A similar pattern was observed in the women, over the five-year period between 2011 and 2016, the probability of men being overweight/obese has increased by 4%. This may indicate that the overall environment in urban Ethiopia is increasingly obesogenic, although it is still at a relatively lower level compared to developed and most developing countries.

TABLE 5.29: PROBIT ESTIMATES AND THEIR MARGINAL EFFECTS OF FACTORS AFFECTING OVERWEIGHT AND OBESITY AMONG MEN IN URBAN ETHIOPIA (POOLED)

	(1) PROBIT COEFFICIENT	(2) MARGINAL EFFECT (DYDX)
Age	0.162***(10.27)	0.0266***(10.34)
Age squared	-0.00179***(-8.75)	-0.000293***(-8.78)
Marital Status		
Never married (Reference)	[Ref.]	[Ref.]
Married and living together	0.261***(4.41)	0.0428***(4.45)
Widowed/divorced/ not living together	0.0305(0.28)	0.00447(0.27)
Religion		
Orthodox (ref)	[Ref.]	[Ref.]
Muslim	0.0650(1.24)	0.0108 (1.23)
Protestant and others	0.00197 (0.03)	0.000317 (0.03)
Occupation		
Unemployed (Reference)	[Ref.]	[Ref.]
Professional, technical, managerial	0.194(1.83)	0.0297(1.90)
Sales	0.345***(3.35)	0.0567***(3.59)
Manual (Skilled, unskilled, agriculture)	0.125(1.27)	0.0186(1.32)
Other	0.158(1.51)	0.0239(1.56)
Frequency of watching television		
Not at all (Reference)	[Ref.]	[Ref.]
Less than once a week	-0.139(-1.33)	-0.0208(-1.29)
At least once a week	0.0822(0.85)	0.0136(0.88)
Ownership of Car/truck		
No (Reference)	[Ref.]	[Ref.]
Yes	0.385***(4.69)	0.0729***(4.14)
Level of Education		
No education (Reference)	[Ref.]	[Ref.]
Primary	0.135(1.28)	0.0172(1.34)
Secondary	0.415***(3.86)	0.0615***(4.41)
Higher	0.483***(4.34)	0.0741***(4.97)
Wealth Index quintile		
Quintile1 (Lowest) (Reference)	[Ref.]	[Ref.]
Quintile 2 (Second)	0.434***(4.28)	0.0423***(4.53)
Quintile 3 (Medium)	0.683***(6.95)	0.0790***(7.88)
Quintile 4 (Fourth)	0.939***(9.50)	0.127***(11.19)
Quintile 5 (Highest)	1.079***(10.54)	0.158***(12.02)
Survey Year		
2011 (Reference)	[Ref.]	[Ref.]
2016	0.258***(5.90)	0.0426***(5.90)
_cons	-5.953***(-20.22)	
N	7282	7282

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using EDHS 2011 and 2016 (men)

5.8.6 Blinder–Oaxaca nonlinear (Probit) decomposition of overweight/obesity

In the nonlinear decomposition analysis, the drivers of the change regarding overweight/obesity among women and men are explored. For women, the analysis covers the change between 2000 and 2016, while for men, the analysis period covers only the five years between 2011 and 2016. During the inter-survey years, the decomposition estimates suggest that the probability of being overweight/obese increased by 0.113 and 0.0482 among women and men, respectively. The covariates included in the model to explain the change in overweight/obesity are the distribution of age, marital status, occupation, level of education, ownership of car/truck, frequency of watching television, and number of children ever born (for women only). The change in the distribution of these variables over the periods under consideration explained about 38% and 21% of the change in the prevalence of overweight/obesity among women and men, respectively. For the women group, all the covariates except ownership of a car/truck and children ever born are statistically significant at least at the 5% alpha level, while for the men group, only the level of education is significant at this level of significance.

The change in the frequency of watching television of the women group explained about 17% of the change in the prevalence of overweight/obesity over the 16-year period under consideration. As presented in Table 5.30, the proportion of women watching television at least once a week has nearly tripled from 22% in 2000 to 61% in 2016. The estimates imply that the increasing tradition of leisure time women spending watching television is behind the rising prevalence of overweight/ obesity in urban Ethiopia. The other most important change driving the prevalence of overweight/obesity is the change in the level of education, which explained about 12% of the increase in the prevalence of overweight/obesity among women. The change in the level of education explained about 43% of the change among men during the five years under consideration.

The demographic transition that is characterised by the shrinking of younger age groups and ballooning of the share of older ages of women explained about the 3% of the change in the prevalence of overweight/obesity among women. This may imply that the demographic transition between 2000 and 2016 is an important driver of overweight/obesity among women. Among men, although the change in age composition explained about 7% of the change, it is not statistically significant at the 5% alpha level (p=0.12). The change in the occupation of women that witnessed a significant shift from manual activities, including agriculture, to professional, technical, managerial, and other jobs explained 4% of the increase in the prevalence of overweight/obesity during the inter-survey period.

The men model result reveals that the constant term constitutes around 105% of the change in the proportion of overweight/obese men in urban Ethiopia between 2011 and 2016, which implies that the increase in the prevalence of overweight/obesity among men is driven by factors other than those included in the model.

TABLE 5.30: DETAILED NON-LINEAR OAXACA–BLINDER DECOMPOSITION OF CHANGES IN THE PREVALENCE OF OVERWEIGHT/OBESITY AMONG WOMEN AND MEN (OVERALL AND EXPLAINED PART)

	(1) WOMEN (W)	(2) MEN (M)
group_1=2016	0.256*** (0.00626)	0.152*** (0.00609)
group_2=2000 (Women) 2011 (Men)	0.143*** (0.00519)	0.104*** (0.00481)
Difference	0.113*** (0.00813)	0.0482*** (0.00776)
Explained	0.0433*** (0.00695)	0.0101*** (0.00302)
Unexplained	0.0699*** (0.0107)	0.0381*** (0.00765)
Explained		
Age	0.00336* (0.00169)	0.00357 (0.00231)
Marital status	0.00278** (0.00104)	0.00228 (0.00174)
Occupation	0.00433* (0.00177)	-0.00692 (0.00535)
Education	0.0133* (0.00568)	0.0208* (0.00827)
Ownership of truck/ car	0.000715 (0.000460)	0.000973 (0.00143)
Frequency of watching television	0.0191*** (0.00384)	-0.0105 (0.00660)
Children ever born	-0.000288 (0.000630)	
_cons	-0.00762	0.0506

	(1) WOMEN (W)	(2) MEN (M)
N	9222	7282

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation using EDHS 2000 and 2016 (Women) EDHS 2011 and 2016 (men)

5.9 CONCLUSIONS

This chapter sought to examine the trends, patterns, and determinants of changes in the consumption of different food categories and adult obesity and overweight in urban Ethiopia. The repeated cross-sectional HCE surveys and EDHS conducted in 2000, 2005, 2011, and 2016 at the national level are employed to examine these themes, with the study period focusing on between 2000 and 2016.

During the 16-year period, urban Ethiopia has witnessed a 51% upsurge in the annual real expenditure per adult equivalent (adjusted to the 2016 prices) and a 56% rise in the daily average calorie consumption. This clearly indicates that this was a period of marked improvements in the standard of living of urban households. Despite the average calories derived from cereals having shown an increase, their share of the total calorie consumption is decreasing due to the fast increment in the contribution from other food groups. While the share of all cereals, such as *teff,* coarse cereals, wheat grain in the consumption of households in urban Ethiopia has been falling over time, it is interesting to note that the share of refined cereals that undergo industrial processing increased steadily from 5% in 2000 to 11% in 2016. On the other hand, the share of pulses remained stable between 6 to 7% of the dietary energy of households in urban Ethiopia over the 16-year period.

The period between 2000 and 2016 saw a 47% growth in the average quantities of ASF consumed in urban Ethiopia, from 17kg/PAE/year to 25kg/PAE/year. During the same period, the quantities of vegetables and fruit consumed in urban Ethiopia exhibited a pronounced increase of 138%, albeit starting from an exceptionally low baseline in 2000. The consumption of ultra-processed foods (UPF) and drinks constitute an exceedingly small proportion of the household budget, and the calories derived from UPF are insignificant. Between 2005 and 2016, the UPF represented between 2 to 3% of the total dietary energy consumed by households in urban Ethiopia. The contribution of dietary energy from fats and oils doubled from 7% in 2000 to 14% in 2016, implying households' increased reliance on these sources for their dietary energy displacing the traditional energy sources, such as starchy staples.

In line with the dietary shift and elevated calorie consumption over time, the prevalence of overweight and obesity among women at reproductive ages nearly doubled from some 12% in 2000 to 22% in 2016. Between 2011 and 2016, the prevalence of overweight among men surged from 7% to 11%, while the prevalence of obesity increased from 1% to 2%. Women are more likely to be overweight/obese in comparison with their male counterparts.

The regression analysis in this study helped to identify household characteristics that determined the consumption level of different food categories, namely, refined cereals, ASF, fruit and vegetables, fats, and oils, and UPF. Younger generations heading a household are associated with more calories from refined cereals and UPF, but less with ASF, fats and oils. On the other hand, households with senior heads consume more ASF, oils and fats, and vegetables and fruits. Higher intakes of ASF, vegetables and fruit, refined grains, fats, and oils, but lower intakes of UPF, are associated with female headships and the married status of the head.

Households headed by males and never-married persons were more likely to consume higher UPFs. As family prosperity improved, people tended to move away from traditional starchy staples towards high-value foods like as ASF, vegetables and fruits, and UPF. Household intake of fats and oils rises with income but dips somewhat for the top 20% of households. The level of educational attainment of the household head was noted to have a strong positive relationship with the intake of refined cereals, ASF, vegetables and fruit, and fats and oil. Households headed by university graduates and those with no formal education consumed a larger share of UPF's dietary energy.

The analysis from EDHS indicates that overweight and obesity were positively associated with wealth. Addis Ababa, Diredawa and Harari and their immediate environ, were noted to have consistently contiguous clustering of the prevalence of overweight/obesity.

Based on the decomposition analysis, the rise in real household income between 2000 and 2016 was identified as the most important driver of the rise in consumption of ASF, vegetables and fruits, refined cereals, and fats and oils. The second most essential element driving the shift in consumption of refined cereals, ASF, vegetables and fruit, and fats and oils was the change in the educational level of household heads. The urban Ethiopian fertility transition also played a role in the dietary transformation. The age of the household head and members had a considerable impact on the change in UPF consumption.

The increasing tradition of leisure time women spending watching television and the change in the level of education was behind the rising prevalence of overweight/ obesity in urban Ethiopia. The demographic transition characterised by the shrinking of younger age groups and ballooning of the share of older ages of women between 2000 and 2016 was an important driver of overweight/obesity among women. The change in the occupation of women that witnessed a significant shift from manual activities including agriculture, to professional, technical, managerial, and other jobs explained 4% of the increase in the prevalence of overweight/obesity during the inter-survey period. This may indicate that the overall environment in urban Ethiopia is increasingly obesogenic from time to time, albeit it was still at a relatively lower level as compared to developed and most of the developing countries.

CHAPTER 6: RESULTS FROM THE QUALITATIVE DATA

6.1 INTRODUCTION

In the first section of this chapter, the findings obtained from the FGDs conducted in Addis Ababa are presented and discussed in terms of the gender and type of occupation of the participants (for example, labourers, taxi drivers, civil service employees, the middle-income group, the high-income group, or university students). The analysis in this part provides the context for the features and drivers of dietary change and the concomitant obesity issues among different segments of the population in Addis Ababa. The last section of this chapter comprises a discussion of the specific features of the dietary transformation happening in the urban Somali region of Eastern Ethiopia. This is based on the FGDs conducted with middle-income adult women (aged 46 and above) in Gode and Jijiga towns. The characteristics and drivers of dietary transformation in the two urban settings (Addis Ababa and Somali towns) have distinct features that stem from dynamics related to the geographic location, the livelihoods of the population, cultures, and traditions of the people.

6.2 EMERGING PATTERNS OF DIETARY TRANSFORMATION IN ADDIS ABABA

The analysis in this section is comprised of six themes that emerged in the focus groups. The themes are: 1) Traditional diets are still dominant 2) Attitudes towards street foods are changing 3) Processed foods are increasingly available 4) Consumption patterns change by age 5) Consumption patterns change according to marital status, and 6) Fast-food consumption differs by income level.

6.2.1 Traditional diets are still dominant

The participants indicated that the traditional foods in various parts of the country may differ based on the geographic location, ethnic group, or livelihoods. Personal taste and the affordability of traditional dishes and brewed alcoholic drinks were said to be driving change. For the most part, traditional foods were venerated. The participants pointed out that the traditional food dominant in Addis Ababa is *injera* (a spongy pancake-like flat bread prepared using *teff* flour). For example:

> *Be the person rich or poor, young, or old, they all eat injera as their major staple food. Injera is the common denominator across all households especially for lunch and dinner* (Middle income woman).

The participants explained there was a marked difference between how rich people and poor people consumed *injera.* Rich people preferred *injera* made from white teff, while poor people ate *injera* prepared from red teff flour mixed with other cereals, such as, maize, sorghum, and wheat. The other difference was the type of sauce eaten with *injera*. Poor households consumed sauces prepared from *shiro* (roasted beans or pea powder) and some vegetables, while rich households ate *injera* with a variety of sauces containing meat, vegetables, *shiro,* or split lentils. All the households used *berbere* (a type of spice prepared from dried red chilli pods, garlic, basil, cardamom, ginger, black cumin, and salt).

The research participants agreed that traditional foods were generally healthier than contemporary Western foods. Some participants associated their preference for traditional diets to the health benefits, the taste, and the cultural significance of the foods. The following narratives were typical expressions of most of the FGDs:

> *I would prefer traditional diets to modern ones like pasta and spaghetti. Traditional foods are healthy for me. I am addicted to injera and could not survive without eating injera at least once in a day. Our traditional foods are healthy, but we need to decrease the amount of fats we add to our diets. Our traditional foods protect us from diseases. While the developed countries sustained unimaginable disasters due to the COVID-19 pandemic, we*

survived with minor losses because of our traditional foods. (High income woman)

A day that passes without eating injera is considered a day without food. I do not think that I have eaten my lunch or dinner unless I have eaten injera. (Male university student)

Some research participants argued that the health benefit of traditional diets over Western diets was clearly manifested during the height of the COVID-19 pandemic. They attributed the relatively lower mortality loss in Ethiopia due to COVID-19 compared to the developed countries to the traditional foods consumed by the people.

There were participants who preferred *injera* to modern foods because it made them feel satisfied at a relatively lower cost.

The size of injera makes people full at a lower cost. On the other hand, modern foods like pizza and burgers, are expensive and are exceedingly small in size. Hence, I would go for traditional foods instead of the modern ones. (Male taxi driver)

Another FGD participant who was also a taxi driver, associated his "loss of physical strength" and his health problems to a shift from the traditional *kocho* (a staple food in Southern Ethiopia prepared from the fermented pulp of the "*ensete*" or false banana) to fast foods:

In the countryside, I grew up eating kocho. Kocho was the source of my strength during my childhood. However, after I came to Addis Ababa, I started eating fast foods. Unlike kocho, you will go hungry immediately after consuming fast foods. At this early age, I have lost my strength, and my health is in a bad shape due to fast food.

However, there were traditional foods that were discussed as sources of health problems. The following quote from a high-income woman mentioned the health risks associated with some traditional foods consumed predominantly by high- income people:

> *Had it not been for the health concerns associated with it, I would love to eat kitfo* (a minced raw beef, mixed with spicy chilis and with a lot of spiced butter) *with kocho every day. My husband and I used to go to a butchery restaurant to eat kurt* (raw beef served with spicy sauce) *every weekend except during the fasting season. However, recently we have reduced the frequency of consuming this, because of the health concerns associated with it.*

All the FGD participants pointed out that meat was consumed more as people's incomes increased, with the main change being from cereals as a staple to beef. They mentioned that butchery restaurants and *kitfo* houses were popping up on every street corner in the city. Except for the fasting season, these "butchery houses" were packed full of clients.

The discussants of the FGDs revealed that traditional drinks like *tella* (local beer*), tej* (home-processed honey wine)*,* and *areque* (distilled local liquor) were vanishing from the market from time-to-time. Outlets that used to specialise in preparing and selling such traditional drinks had switched to factory-processed drinks, such as beer. The main reason for this was that the traditionally brewed drinks were no longer tenable because of the high input price for the ingredients, and it was also cumbersome to brew. Some participants, however, argued that these traditional drinks were making a comeback at wedding ceremonies and traditional festivities. According to the participants, coffee was the only traditional drink that remained ubiquitous in both urban and rural Ethiopia.

6.2.2 Attitudes towards street foods are changing

The FGD participants indicated that there was a profound change in the attitudes of people in favour of fast foods or street food. For example:

> *In the past, there was a saying, "fried bread is a lunch for hooligans." Such a saying no longer holds true, as it has become lunch for everyone. People from all occupations consume fried bread with tea from street vendors.* (Male labourer)

It was asserted that women were not traditionally allowed to buy and eat food from street vendors as this was regarded as not befitting a "decent and cultured" woman. However, these ideas were fast fading away. The following narratives described gendered attitudinal shifts in fast food consumption:

> *In the past, if a woman was seen eating sambuusa or other food in the street, she was treated was a deviant. No man would like to marry her. It was shameful for a woman to buy prepared food from a shop or the street. Such attitudes are waning these days* (Middle-income woman).

> *In the past, it was taboo for a woman to consume food away from home. This was allowed only for men. Today a woman can order and consume prepared food just like a man. Currently, people consider consuming fast foods on the street as a sign of modernisation.* (Middle-income woman)

6.2.3 Processed foods are increasingly available

There has been a profound change in the food landscape of Addis Ababa. The participants asserted that it was not common to find Western dishes in hotels and restaurants as they tended to serve traditional dishes. For the ordinary diet of the city's inhabitants, however, the choices had changed in favour of modern processed foods:

> *Packaged foods, like instant noodles, packaged juices, and processed milk, were not common at convenience shops. Fast foods like chips, burgers, pizzas, sandwiches, and pastries were regarded as luxurious foods available only at a few places for high-income people. Now, all these are stories of the past. All these foods are now available everywhere.* (Female government employee)

6.2.4 Consumption patterns change by age

The FGD participants. particularly the women, noted that children's daily diets have changed dramatically over the past few years:

> *For small children, the diet has been changed from meals dominated by traditional foods like porridge, kita* (flat bread)*, atmit* (loose porridge)*, kinche* (cooked cracked wheat or barley seasoned with butter), *and cow's milk to pasta, instant noodles, processed foods, and milk powder. However, children from poorer households may still eat mainly traditional foods along with cheaper processed foods like biscuits and instant noodles.* (Middle-income woman)

From the discussions, the participants all agreed that small children no longer drink cow's milk, but instead, drinks prepared from milk powder. The major reason cited as a cause for the shift was the unavailability of "pure cow's milk:"

> *During our childhood, my siblings and I were raised by drinking cow's milk. All the children of our time were brought up like us. Now parents have to buy powdered milk to feed their small children. There was no such thing as factory processed milk-powder in our time. There is a shortage of cow's milk, and even if available, it is often not safe.* (Female government employee)

For school children, the dietary shift had different patterns in a school setting and a home setting. In both settings, there is a marked difference in the type of food consumed between children from richer and poorer households. A middle-income FGD participant suggested:

> *Children from high-income families take packaged juices, soft drinks, chips, crackers, and cakes for snacks. It is also customary for children to take modern foods for their lunch at schools, although there is a significant difference based on income levels. While children from poorer households tend to have traditional meals dominated by injera for their lunch, the richer ones may bring modern foods like boiled eggs, pizzas, burgers, sandwiches, and fruits. Everyone eats pasta.* (Middle-income woman)

The participants also observed that they thought children preferred processed foods:

> *Children like to eat pasta or instant noodles rather than traditional foods like injera. Mothers also prefer to prepare instant noodles for their children because it is easily available at every shop and the preparation is quick and easy. It is also fashionable.* (Middle-income woman)

> *Most of the time, packaged foods are preferred by my children. I cannot afford to buy expensive foods like pizzas and burgers. I rather buy them fast food like biscuits, instant noodles, soft drinks, and bakery bread.* (Male labourer)

The discussants revealed that both young men and women prefer to eat away from home unless constrained by their incomes. The type of food they consume may be both traditional and modern.

> *Young people and adults normally eat traditional foods for their lunch and dinner. It is also normal for them to eat roasted and raw beef at butchery houses occasionally based on their level of income. They consume a mix of modern foods and traditional foods at restaurants and cafeterias. They also spend their leisure time drinking beer at bars and macchiatos at cafeterias.* (Male university student)

Older people normally consume traditional foods prepared at home. This perception was assumed to be related to older people's health concerns and the idea that the older persons in society should exhibit "responsible" behaviour, including eating habits. For example:

> *Unlike the young ones, older people do not eat everything they get because their health is more likely to be compromised. They would prefer to eat traditional foods prepared at home. They limit the amount of salt and sugar, the type and amount of oil used, in their meals. They are also expected to behave responsibly as they are respected within the community.* (Male taxi driver)

> *Most of the time, older people do not eat pre-packaged foods. They do not like the taste as they are not used to it.* (Female government employee)

In most of the FGDs, the participants opined that there are marked difference between males and females regarding their diets. Despite attitudinal changes in recent times, men are still more likely to consume foods away from home in contrast with women. Men eat both traditional and modern food away from home depending on their preferences and income levels. On the other hand, women tend to buy food from markets to prepare and consume at home. In all FGDs, women's normative roles that entailed being responsible for managing the household's financial expenditure on food were emphasised:

> *Women are smart as they have better know-how about resource management. They use their money efficiently. They buy grain, vegetables, meat, oil, or other foodstuffs and prepare nutritious meals for consumption at home. They can prepare healthy food for their family members at a low cost. On the other hand, most men do not have this type of skill. Men buy prepared foods for their immediate consumption away from home.* (Government employee woman).

> *Women have the cooking skills to prepare healthy food at home. In addition, they tend to avoid unhealthy foods because they are conscious about keeping their shape and fitness.* (High-income woman).

These traditional gender roles were so deeply ingrained, that some of the participants labelled women who bought prepared food as "lazy." This implies that patriarchal gender norms prevailed that put women in subordinate positions in terms of decision-making regarding the household's diet and food purchases. Although women were regarded as "naturally" possessing the skill to prepare meals on a budget, men were not tasked with these domestic duties and were seen as perfectly entitled to buy food away from home for their own consumption as they saw fit.

6.2.5 Consumption patterns change according to marital status

In all FGDs, marital status is clearly illustrated as a significant factor shaping the food consumption behaviour of people. There was consensus among participants that never married men and women were more likely to consume food away from home in contrast with the married ones. The following narratives from the FGDs clearly elucidate how the marital status dynamics affects food choices and consumption behaviour.

It is normal for young dating couples to meet at restaurants and cafeterias serving fast foods. The more regularly they meet, the more they consume fast foods like burgers, pizzas, sandwiches, and cakes. (Female university student)

Young never-married men eat mostly away from home as they do not have cooking facilities or skills. Never-married women are more likely to cook food at home as compared to their men counterparts. (Male taxi driver)

The narrations tended to articulate it as a sign of being a "responsible married couple" to prepare and consume at home. This was explained in terms of the cost of living, and a married couple's responsibilities to save money to cover costs, such as rent and children's school fees.

Married men and women even pack and take their lunch to their workplaces. Newly married couples may occasionally go dining together at restaurants. But the frequency decreases as children join the family and responsibility increases. (High-income woman)

Even divorced men may hire a housekeeper to cook and clean the house. These men are not as free as never-married men. They are expected to care for their children. (Male government employee)

In women only FDGs, the participants expressed the view that women were more likely to concede their food choices to match those of their husbands. Thus, the family diet was more likely to match the food preferences of the male head of the household, although women were in charge of purchasing food and cooking for the household.

6.2.6 Fast-food consumption differ by income level

Both rich and poor individuals were regarded to be eating fast foods, with the only difference being in terms of the type, price, and quality of food they ate.

> *Those who have a better income, eat expensive meals like pizzas, burgers, and sandwiches. They also buy ice-cream, cakes, chocolates, and milk powder for their children. The poor consume cheap processed foods and drinks available from the street vendors like chips, sambuusa, and soft drinks.* (Middle-income woman)

> *While we are at work, most of the time, we buy and consume cheap fast foods such as chips, sambuusa* (fried bread)*, and biscuits for our lunch. Because it is fried with edible oil, you do not feel hungry throughout the day. We also occasionally go with friends to restaurants and eat pasta, beef, and injera.* (Male taxi driver)

> *Children from high-income families are obese since they eat fast foods, such as burgers and chips. Children from high-income groups follow foreign consumption styles.* (Female government employee)

> *Because I cannot afford to buy a decent meal, I consume fried bread* (sambuusa) *with tea for my breakfast.* (Male taxi driver)

6.3 PERCEPTIONS OF WHAT CONSTITUTES "BAD" FOOD CHOICES

The focus group participants identified two types of "bad" food choices. The two themes that emerged under this topic were fried foods and expired pre-packaged foods. This view had limitations because other processed foods, such as cakes, burgers, and sweetened beverages, which were normally regarded as a cause for concern for health, appear to be left off the list of "bad" food choices. Added to this, the participants labelled products as “bad” choices because they were expired, which may imply that unexpired wafers, chocolate, and milk powder appeared to be acceptable.

6.3.1 Fried foods

Fried foods sold on the street or in shops, are identified as bad choices. The participants repeatedly raised their concerns about the safety and quality of fried foods, particularly in relation to the oils used in the preparation of these dishes and the unhygienic preparation and storage procedures:

> *Fried foods like samosa and chips are unsafe since the same frying oil is used repetitively - for up to five days. Consuming such fried food will lead to gastritis or other unknown diseases. People with lower incomes eat this since they cannot afford better-quality food.* (Male taxi driver)

> *There is a sanitation problem with the preparation of fast foods on the street. Fast foods, in general, are not good for one’s health. I am suspicious of the ingredients of foods prepared away from home. Inferior quality palm oil is used for the preparation of foods outside the home. This type of oil is not good for one’s health. However, since I do not have any other option, I eat it.* (Male labourer)

> *Business owners are profit oriented. They always seek to maximise their profit and minimise their cost. They use cheap and poor-quality ingredients like coagulated oil. Such cheap ingredients are not good for our health. Business owners do not bother about the health of their customers.* (Male taxi driver)

> *Fried foods prepared on the street are unhygienic since such foods are exposed to dust.* (Male labourer)

6.3.2 Expired pre-packaged foods.

According to the participants, imported pre-packaged foods are expensive and stay on the shelf for extended periods. When their expiry dates pass, commodities are sold at cheaper prices, and cause health problems. A businessperson narrated her experience as follows:

> *I asked an importer colleague about the extremely low quality of chocolate on the market. He revealed that the chocolate has expired in Europe and is collected, reprocessed in a factory, packed, and dispatched to African markets. Consuming such chocolate will obviously predispose people to diseases*.

Another participant from the same group accused the traders of endangering people's health by importing and selling such items. She also blamed the government for permitting the importing or ignoring the operations of traders that had a detrimental effect on people's health. She noted that she knew from her experience that wafers, chocolate, and milk powder, among others, are typically reprocessed and repackaged expired and dumped on the local market.

> *Such products are bulked with other ingredients that make them look cheap for their size. Notwithstanding the fact that our traders are aware of the health risks they import and sell to the public because our market is poorly regulated by our government.*

Children from low-income families are more prone to fall into the trap of cheap, poor-quality processed foods that big businesses are dumping in their quest for profit. These cheap and unhealthy products are promoted as options for the underprivileged to eat the same food items that the children of wealthier families are enjoying. This may emanate from the perception that “western foods” are superior to the local traditional foods. The participants admitted that they had observed children who had vomited immediately after consuming such cheap processed foods. Since the participants lacked the capacity to recognise how these things can damage the children's long-term health, they narrated only the apparent and instant effects they observed.

6.4 UNDERLYING DRIVERS OF DIETARY CHANGES IN ADDIS ABABA

The Addis Ababa FGD participants highlighted drivers of dietary transition in the city including.

- Social marketing that promotes western foods as superior foods.
- Digital technology for the ordering and delivery of western meals is another important driver mentioned.
- Price, availability, and taste of traditional foods as opposed to western foods.
- The changing food environment, factors related to the proliferation of street and fast-food vendors, the opening of foreign restaurants, and schools serving as a channel for the expansion of western foods.

6.4.1 Social marketing

Social marketing through online and electronic media is a powerful driver of the dietary transition. Advertisements promoting the taste, affordability, convenience, and availability of western diets abound on television shows, radio broadcasts, and, especially, the social media. The participants explained that fast food advertisements targeted children and that shaped their consumption patterns. Children asked their parents to buy specific brands of processed foods that they saw advertised on television. Social marketing appears to create the impression in children that western foods are superior to local traditional foods. The following quotes clearly illustrate this:

> *Children request their parents to buy them snacks, chips or tasty processed foods advertised on television.* (Male taxi driver)

> *Children demand from their parents to buy them certain brands of chocolates, chips, candies, or juices advertised on television.* (Male taxi driver)

> *My brother suffered a lot because his son was addicted to processed foods advertised on TV. Every day, he asks him to buy specific brands of processed foods.* (Male labourer)

Television marketing, however, was, of the opinion of the FGD participants, being replaced by social media. Social media, in addition to its role as a vehicle for spreading information about the preparation of various dishes, plays a critical role in advertising and is thus shifting consumption patterns in favour of Western foods. The younger participants repeatedly particularly mention this role, for example:

> *My friends and I use social media, such as Facebook, TikTok, Telegram, and Instagram to access information about the types and prices of modern foods in different restaurants or cafeterias. The appealing advertisements on modern foods, target children and the youth.* (Female university student)

> *The advertisements on social media are designed to captivate the interest of people from different income levels. They offer a range of packages for modern people regarding the prices and ingredients. What surprises me is that you can hardly find advertisements for traditional foods on social media. Sometimes traditional foods may be advertised on TV but not on social media.* (Male university student)

Social marketing was blamed for the preferences for fast foods, however, many participants indicated that they were not immune to the attraction of *YouTube* videos that showed them how to prepare foods from all over the world. *YouTube* was often mentioned in the FGDs as an important vehicle for the diffusion of a global food culture, particularly for high-income and medium-income groups. For example:

> *Thanks to YouTube, we can easily see the food preparation of different countries. Most of the ingredients are available in supermarkets and, if not, my relatives abroad send it to me. I personally prepare diverse types of dishes for my children by searching on YouTube. I first try it, how to prepare it, and test it to know if it is tasty or not. If my children enjoy the taste, I will prepare such dishes once a week.* (High-income woman)

6.4.2 Online ordering and delivery facility

According to the participants, a new phenomenon emerging in the food environment is the advent of digital technology that enables customers to order fast food online and get it delivered. Customers order fast food using their phones or online platforms, and the service providers deliver the ordered item at home by motorbike. Food delivery companies partner with restaurants and include the data of the restaurants on their platforms. Customers can order the food from a range of optional restaurants from the online platforms. In some cases, restaurants have their own delivery mechanism. The following narratives illustrate how the availability of the service has boosted the consumption of fast food:

> *When I go out, I order pizzas, burgers, chips, and, so on, online for my children at home. They deliver them instantly to my children at home. The situation is different from when I was a child. Now everything is digitalised and convenient. It is a bit expensive, but you do not feel the pinch when it is online* (High-income woman)

> *Whenever I am bored with the food at home, I order pizza online, and they deliver it to my doorstep immediately using a motorbike.*

My parents are always perplexed about how digital food shopping works, and they ask me to order food whenever they have guests at home. (Female university student)

6.4.3 Prices of traditional foodstuffs versus processed and subsidised foods

Some participants indicated that they had to resort to processed cereals because traditional foods were expensive. The following quote is a case in point:

As I do not have a wife that bakes for me at home, I used to buy injera from shops, prepare sauces myself and eat my lunch and dinner. However, these days, the price of injera has escalated to more than 10 Birr per piece, which is unaffordable for me. I resorted to substituting injera with bakery bread. I set out early in the morning and queue at the Sheger bread outlets where you can buy it at subsidised prices. I used to assume that I could not survive a day without injera, but now I am forced to eat bakery bread because it is no longer affordable for me. (Daily labourer)

The unaffordability of fruit and vegetables is reported to have led to the consumption of processed foods:

Fruit and vegetables are widely available on the market, but they are not affordable for us. Even if we want to provide fruit and vegetables for our children, the prices are beyond our reach. We trick our children into not asking fruits by buying them biscuits instead. (Male labourer).

Some participants noted that although they knew that eating fast food is dangerous for their health, poorer members of society, such as taxi drivers and daily labourers, still eat them because they cannot afford traditional foods. A comment from a taxi driver clarified this:

> *We know the health risks of street food. However, we do not refrain from eating it as normal food is unaffordable for us. Every one of us has different health problems because of our consumption habits at our age.* (Male taxi driver)

6.4.4 Unavailability of healthy food options

In addition to the affordability problem, the unavailability of some traditional food on the market also meant that consumers resorted to cheaper, processed food options. One participant added that this was a particular issue regarding the unavailability of cow's milk:

> *During our childhood, we were brought up drinking fresh cow's milk. These days, it is difficult to find fresh cow's milk. Milk sellers add water or other foreign matter to cow's milk. Hence, people resorted to factory-processed milk powder, and milk substitutes, although it is expensive and not as healthy as fresh cow's milk.* (Middle-income woman)

6.4.5 Tasty and time-saving fast foods

The FDG participants expressed the opinion that the youth and children were especially attracted to fast food because they were tasty and appealing. For example:

> *My children would like to eat fast food like burgers, pizzas, fried bread, and bread with jam. They are not interested in eating traditional foods. They are hooked on the taste and look of fast food. Some children do not drink water…they insist on drinking juice or soft drinks.* (High-income woman)

> *From a health perspective, homemade traditional foods are better than fast foods. But the new generation is driven by a taste for*

modern food. They do not listen to advice about the health risks associated with it. (Male labourer)

In addition to the taste, fast food was seen as convenient and timesaving. The FDG participants opined that people with lower incomes ate fast food since they were readily available and saved time:

I personally use fast foods from street vendors. It is a quick fix when you go to work without eating breakfast. (Male government employee)

Processed food, like instant noodles, is available from every shop and is ready for consumption within a few minutes. This is ideal for mothers who do not have time to prepare a proper meal for their children. (Middle-income woman)

6.4.6 Proliferation of street and fast-food vendors

Because of the lack of employment opportunities in the other sectors, girls and women are increasingly resorting to earning a living as sellers of fast food. According to the FGD participants, street vendors preparing and selling fast food have been flourishing in recent times, which altered the food environment in the city. The most common fast food reported by the participants prepared and sold by street vendors included: sambuusa, chips, vegetable sandwiches, boiled potatoes, fried bread, and *bombolini* doughnuts. The increased number of vendors expanded the availability and accessibility of fast food.

I have lived in Addis Ababa for about fifteen years. The past few years, in particular, I have seen many more street vendors selling fast food. Previously, fast food such as sambuusa, chips, and fried

> *bread were available only at a few tea houses. But now you can find these on every corner of the city.* (Male taxi driver)

The ubiquitous presence of cheap fast food on the streets in areas frequented by low-income people is a factor mentioned by many participants as drivers of the increased consumption of unhealthy fast foods. The participants pointed out that such fast-food selling points tend to target construction sites with many daily labourers. Added to this, fast food sellers set up their selling points to target pedestrians and commuters going to and returning home from work. On their way back home, these people buy and consume these fast foods as snacks or refreshments.

6.4.7 Competition in school settings

The school environment is reported to be a key point for influencing consumer tastes for food. The FGD participants explained that the food children take to school is a basis for competition to show how modern they are.

> *My third daughter is particularly active when it comes to food. She requests me to prepare the type of food she sees that her friends at school bring along. I prepare the meal that she requests of me. When children see something new, they want to taste it. In my view, there is an improvement in the preparation and utilisation of the meals that we consume. There is a profound change in the dynamics of the consumption pattern.* (High-income woman)

> *These days, children are very vocal about, and more aware of what they eat. They watch others, and they taste the food. I also tell my children to look out for new types of food and dishes that the other children bring to school. I also tell them to check the ingredients of new dishes or food. I also ask their teachers if there is a special type of food eaten by the other children.* (High-income woman).

6.4.8 Foreign restaurants

For the university student and high-income participants, the opening-up of foreign (also known as ethnic) restaurants facilitated the introduction and consumption of hitherto unknown types of foods to the residents of the city.

> *There are many foreign restaurants in Addis Ababa like Indian, Chinese, Korean, or Arabian. This gives us the opportunity to know and eat the dishes from other countries. Consequently, foods that were unknown to us are now becoming widely consumed*. (Female university student).

Foreign foods were spreading not only due to the opening of foreign restaurants, as one respondent explained that her change to pre-packaged food was mainly driven by her experiences abroad.

> *I stayed in Arab countries for ten years working as a domestic cleaner, so I adapted their eating habits. Almost all the foods I eat now are packaged foods, like noodles, prepared foods, soft drinks, and rice. I seldom eat homemade traditional foods.* (Middle-income woman)

6.5 OBESITY AND PHYSICAL ACTIVITY

The themes that emerged with regard to obesity and physical activity are

- How the environment is becoming increasingly obesogenic.
- How attitudes towards obesity are changing.
- The perceived consequences of obesity.
- Behavioural changes in recent days. The findings with regard to these themes are discussed in the following section.

6.5.1 Obesogenic environment

The participants of all the FGDs agreed that the city environment was increasingly obesogenic, and there were more obese children and adults than before. They believed that this stemmed from an upsurge in the consumption of fast food and sedentary lifestyles. There were a few participants who mentioned that obesity can be hereditary, or can be ascribed to hormonal imbalances, especially due to the use of hormonal contraceptive methods. However, most of the participants believed that obesity was mainly prevalent among the children and adults of high-income people. For the participants, the trend of child obesity was worrisome.

> *When I was first employed as a librarian some years back, the number of obese children coming to the library were very few. Most of the children were in a good shape. But these days, it is common to see obese boys and girls coming to the library. Because they are extremely fat, they look like aged adults at a young age. The health prospects for these children in this country are worrisome.* (Female government employee)

Most of the participants believed that rich individuals consumed many high calorie greasy and sweetened food, and they did not burn the excess calories because the affluent had their own motor vehicles and no longer walked to where they had to be. In addition, the demands of their work meant that they had little time for physical exercises. The participants all agreed that, amongst the more affluent groups, women were more likely to be obese than men. In addition to eating larger quantities of unhealthy food, the participants accentuated the sedentary lifestyles of the youth due to their immersion in the digital and electronic world. For example, the FGD participants who were university students, indicated that they spent at least five to six hours per day watching movies, playing online games, and chatting on their mobile phones. They confirmed that they did not spend much time watching TV, which they said was more prevalent amongst the "older generation." This led to them being physically inactive for a longer time, likely predisposing them to the risk of obesity. A concerned parent participant narrated the experience of her daughter as follows:

> *My daughter spends the entire day on Tik-Tok, Facebook, YouTube, and messaging her friends. She does not leave her room. I advised her to reduce the time she spends onscreen, but she does not listen to me as she is addicted to it.* (Middle-income woman)

Women staying at home are reported to spend a substantial portion of their time watching TV. According to the participants, there were adult women and elderly that spent the entire day watching satellite television channels that broadcast TV drama series dubbed into Amharic. The following quote illustrates this:

> *I was miserably addicted to watching drama series over satellite TV… to the extent I cannot cook properly for my family. Several times, I burnt the food because I was absorbed in the drama. My conversation with my friends was only about the characters in the dramas.* (Middle-income woman)

6.5.2 Attitudes towards obesity

The participants noted that attitudes towards obesity have shifted markedly over the past years. Previously, obesity was regarded as normal and a sign of wealth and prosperity. The community used to encourage people to pick up weight as a sign of good health, and more affluent families regarded a diet of contemporary fast foods like pizzas, burgers, and soft drinks as a demonstration that they were modern and were able to afford these kinds of food. This attitude is changing as the complications associated with obesity are becoming more apparent. The participants from all the groups asserted unanimously that obesity was now regarded as a problem rather than as a sign of prosperity. One participant suggested that binge eating was a problem she had observed in an incredibly young person:

My friend has an eight-year obese daughter. Her parents are extremely worried about her weight, and they do everything to restrict her consumption of sweets and fatty foods. At times, when the family hides food, she searches for it and eats it, even during the night-time. (High-income woman)

6.5.3 Obesity and its consequences

The participants could name different problems associated with obesity, mainly in terms of adverse health outcomes, discrimination in transport service, and mobility issues. The FGDs participants perceived that the spread of non-communicable diseases in the city is primarily related to the dietary transformation and the subsequent obesity epidemic. They suggested that healthcare facilities are overwhelmed by people from all occupations suffering from noncommunicable diseases such as hypertension, diabetes, cancers, and cardiac ailments. These diseases were hitherto diseases of the elderly, and they are expanding their territory to youths and children. A woman participant shared the following story:

My cousin was 45 kg and healthy when she left for the Arab world. She is now 99 kilograms and is suffering from various of diseases- hypertension, diabetes, cardiac problems. (Middle-income woman)

The taxi drivers group discussants openly disclosed that they discriminate against obese clients. The following narrative represents this view:

When overweight commuters come to my taxi, I ignore them as they require more seating space in the taxi. In addition, they take time when entering and getting off the taxi. I would rather prefer to have a greater number of thin people. This is because I have to generate more money from a greater number of passengers and save my time. (Male taxi driver)

The infrastructure of the city is believed to be inconvenient for obese people as there are no decent sidewalks in the city. The perception was that many obese individuals also struggle to walk, and therefore have difficulty getting around the city and climbing stairs. For example:

> *These days obesity is a growing problem in the city, particularly amongst high-income people. Last week, I saw a 95 kg weighing obese boy who was struggling to cross a small ditch. His friends left him behind, and two passer-by adults helped him to cross.* (Male taxi driver)

6.5.4 Behavioural changes

The participants believed that people only change their behaviour if a healthcare expert tells them to. For example:

> *A physician told my mother that she has diabetes, hypertension, and high cholesterol. A lot of medicines are prescribed for all these illnesses. After that, she stopped eating meat, greasy foods, sugar, and salt, her need for medicine decreased. Now her meals are prepared separately from the meals prepared for the family.* (Middle-income woman).

Some participants opined that such a direct behaviour change after a clinical diagnosis is not possible in all cases. In this regard, a lifetime of poor dietary habits was linked to cancers that are slower to detect than hypertension or diabetes. For example:

> *New diseases, which did not exist in the past are emerging now. Several types of cancer are pervasive in connection with people's dietary consumption behaviour. Observing this, I decided not to consume packaged juices and soft drinks, since I am scared of the ailments associated with it. I prepare fresh fruit juice for my children.*

I want to prohibit my children from consuming fast foods. (High-income woman)

Norms for physical beauty were discussed as pertaining to women only. For example:

I have stopped eating sugary, greasy, and salty foods since the age of 33. I am now 40. I am doing this to keep slim and for my health. (High-income woman)

In general, physical exercise in the light of the urban obesity crisis was discussed as a growing trend. It is common to see older people doing physical exercises in the streets of the city. Some participants asserted that they do not engage in physical exercise, since they are busy, and some of them do not have places conducive to conducting physical exercises.

6.6 DIETARY TRANSFORMATION IN THE URBAN SOMALI REGION OF EASTERN ETHIOPIA

This section discusses the findings derived from the focus groups on how the consumption patterns of Somalis in Eastern Ethiopia have evolved from traditional dishes to processed diets over the years, the drivers of the transition as viewed by the participants, and recent emerging trends.

6.6.1 Traditional foods of the Somalis of Eastern Ethiopia

According to the FGD participants, the traditional foods of the Somalis are the following:

- ***Soor/ Shuuro*** is a type of porridge prepared from maize or sorghum. It is eaten with milk, vegetable soup, and butter. To prepare the *soor/ shuuro,* women pound the grain using a type of pestle called *mooye.*
- ***Ambuulo*** is prepared using maize or sorghum grain. They boil the grain for an extended period of time (between three to four hours) and add sesame oil, ghee, or

milk. In some cases, they may add boiled beans to the *Ambuulo.* It also requires large amounts of firewood to prepare *Ambuulo* due to the long boiling time.

- ***Anjera*** is a type of flatbread made from wheat flour bought ready milled. Sometimes a little sorghum or maize flour may be added to the wheat flour. Women usually mix the flour with water and leave the dough to ferment before it is baked in the morning. The FGD discussants pointed out that the preparation of *anjera* is easy and quick which helps them to feed their children early before they are dispatched to attend to cattle or to go to school.
- ***Mufo*** is a type of bread prepared from maize flour. *Mufo* is baked from dough made from cereals, usually with hot stones on an open fire.
- ***Milk,*** specifically raw, fresh milk from cattle, camels, sheep, and goats is consumed without further processing. Buttermilk is produced and used as is, or in cooking, but does not get processed into cheese. During a period of scarcity, priority is given to children getting fresh milk, as this is regarded as the cornerstone of good nutrition.
- ***Ghee and fats***: Ghee is extracted from camel, cow, and goat milk. In addition, the Somalis used to extract fat from the hump and bones of butchered camels. Traditionally Somali women are encouraged to consume many of these fat sources to assume the body shape regarded as plump and beautiful.
- ***Meat:*** goat, sheep, camel, and cattle meat are consumed in diverse ways.

6.6.2 Dietary transformation among the Somalis

The consumption of local cereals (sorghum and maize) is declining slowly and being replaced by imported foods (rice, pasta, sugar, wheat flour, and oil). The participants explained that food consumption patterns have shifted from locally produced staples towards factory-processed and imported foods in the past years. Now the dominant food items preferred and consumed by the population are imported items, such as rice, pasta, wheat flour, sugar, and cooking oil. According to the FGD participants, traditional foods are consumed mostly by the elderly and the extremely poor, and it is no longer a preference for the younger generation. A woman participant from Gode recalls:

> *The younger generation, the children, despise any food prepared from the traditional grains. They do not want to see any ambuulo at all.*

Most FGD participants favour the shift to the new diet since it is simple and quick to prepare. Because they are so accustomed to manufactured foods, the younger generation despises meals made from local grains.

Sugar is the most important source of energy for Somalis. The role of sugar in the diets of the Somali is growing and added in copious quantities to almost every type of dish prepared and consumed. An elderly FGD participant from Jijiga recalls that the consumption of sugar was not common among the Somalis:

> *People used to drink tea flavoured with spice, milk, and a small amount of salt, but without sugar. Now we cannot survive a day without sugar. We consume more sugar than cereals. It is added to every type of food we consume.* (Adult male from Jijiga)

Buying sugar takes the largest share of the food budget in both well-off and poor households. The focus group discussants in Jijiga indicated that:

> *A typical family of six members may buy 50kg of sugar for a month.* (Adult female from Gode)

> *A typical better-off household with eight to ten members would buy 75kg of sugar, 50kg of rice, 10kg of pasta, 25kg of wheat flour, and 10 litres of oil for a month. Poor households also spend substantial portions of their income to buy sugar. In times of shortages of a disposable income, poor households reduce their purchase of cereals (including rice, pasta, and wheat flour), before reducing their sugar purchase.* (Male from Jijiga)

6.6.2.2 Rice and pasta emerged as the most important food for lunch and dinner.

Rice and pasta imported from abroad are now the dominant staple foods in Somali towns irrespective of the social and economic status. The difference between the poor and the rich with regard to rice or pasta consumption is only in the type of sauce applied. The rich may consume rice and pasta dishes with a meat sauce, while the poor eat it with vegetables or oil. In Gode, an elderly woman recalls her experience:

> *Rice was prepared when we were visited by guests from far-off places at nighttime. We used to borrow rice from our neighbours when the household was visited by guests in the evening as it takes a lot of time to prepare traditional meals at night. We had to find out which neighbours had rice to share. Only very few households could keep rice in their house for emergency purposes.*

6.6.2.3 Traditional fats replaced by vegetable oil

The traditional sources of fats such as ghee and fats extracted from camel humps and bones were replaced with commercial vegetable oil imported from abroad, which was easily available on the market. An elderly man FGD participant noted that:

> *With the scarcity of camel milk and slaughtered camel meat, no one cares to do the tiresome work of extracting ghee or camel fats these days. Imported vegetable oil is preferable whenever available.*

6.6.2.4 The ingredients of anjera changed from traditional cereals to factory-processed cereal

The most common meal for breakfast is *anjera.* According to the FGD participants, *anjera* was prepared using sorghum, maize, and wheat until it shifted to factory-processed wheat flour. Edible oil (preferably sesame oil) or ghee (if available) is spread on top of *anjera* and eaten with sugary tea. Members of poor households may drink tea or milk for their breakfast without *anjera.*

6.6.2.5 Reducing the quantity rather than shifting away from processed foods

The participants asserted that the prices of imported food commodities increased day-by-day primarily due to the devaluation of the local currency against a basket of foreign currencies. Despite this, nevertheless, they asserted that they reacted to price hikes or real income depletion by reducing the quantity of food they bought. For them, shifting the items to less preferred and cheaper cereals like sorghum and maize was not an option to consider, no matter how limited their income would be. At household level, they employed such strategies as reducing the number of meals and the size of the portion when encountering such a situation.

6.6.2.6 Limited consumption of vegetables and fruits

Vegetables are not consumed widely among the Somalis. This is due to the limited availability of vegetables in general in the market and the preference of households to use their limited income to purchase rice, pasta, wheat flour, sugar, and oil. Sweetened packaged fruit juices and soft drinks are widely consumed instead of fresh fruits that are absent in the market. The traditional diets comprised meat, milk, and cereals, and did not usually include fruits and vegetables.

6.6.3 Drivers of dietary transformation among the Somalis

In this sub-section, the major factors that emerged in the FGDs as drivers that accelerated the adoption of dietary transformation from traditional staples constituting cereals, milk, and meat-based diets to dishes dominated by imported foods like pasta, wheat flour, rice, vegetable oil, and sugar are discussed. The factors mentioned were climate change, changing social relationships, humanitarian relief efforts, the belief that drinking excessive amounts of sugar in the morning will stave off hunger, and the availability of cheaper food alternatives on the market.

6.6.3.1 Climate change induced dietary transformation

Climate change intersects with conflict in the Somali region for the last several years and has significantly suppressed the production of crops and animal source foods. There are two pathways through climate change as a cause for dietary transformation. Firstly, the repeated crop failures due to protracted drought or the early cessation of rain that diminish staple crops for local consumption. One male adult from Jijiga recalls his experience as:

> *I planted maize three times, and all my attempts failed. I got only five kilograms of maize after the cumbersome process of preparing the land, sowing, and weeding. I was disappointed and abandoned agriculture. Why do I waste my energy, while there is no return from it? Our market is full of imported food items available throughout the year.*

Secondly, livestock and animal source foods are dwindling due to climate change and the concomitant land degradation and the infestation of the land with *Prosopis juliflora* weed. A participant in Jijiga explained:

> *In the earlier days, we used to eat ambuulo prepared from locally produced sorghum or maize. We seasoned the dish with milk or ghee, which are both inaccessible to us after the drought killed off our livestock. Cereals without milk or ghee are not palatable. We have to find alternatives. In our case, the imported processed foods are those alternatives, and these are available throughout the year. On the other hand, the unavailability of fresh milk has led better-off households to rely on commercial milk powder.*

6.6.3.2 Changes in the social relationships amongst the people in Somalia

Many FGD participants explained how eating imported foods like rice, wheat flour, pasta, sugar, and vegetable oil are, in fact, consumption patterns forced on people during the massive exodus of Ethiopian Somalis fleeing the country to Somalia in the 1977 Ethiopia-Somalia war. The exodus that followed the regime change in 1991 brought further hordes of people who had by then adopted the eating habits of the Italians (for example, pasta) and British colonisers. A young adult in Jijiga noted:

> *I have my clan people in Somaliland, and we visit one another, which is a vehicle for the adoption of diets.*

6.6.3.3 Humanitarian relief efforts accelerated the adoption of the dietary transformation

The conversations about the impact of humanitarian relief efforts on the changing diets elicited differences of opinion. Some participants suggest that diets transformed as far back as the 1974 drought, while others associate it with the recent droughts of 1998. According to the FGD participants in Gode, they first encountered wheat flour and pasta during the relief operations of humanitarian agencies. Because the relief food was widely available on the market at cheaper prices, other people who were not direct relief beneficiaries started adopting the new food items. Traditional reliance on livestock as sources of milk and ghee was abandoned because the livestock perished during the drought.

6.6.3.4 Excessive sugar due to perceived higher energy need in connection with hot climate

Some FGD participants attributed the consumption of excessive sugar to excessive energy needs in connection with the hot climate in the area. The participants indicated that they consumed a large amount of sugar, particularly during hot seasons that start each December and continues until April. For example:

> *We feel lethargic as the scorching heat strikes us. Consuming a lot of sugar is the silver bullet to defeat the energy deficiency. Because we cannot get food for lunch in the field, we drink a lot of sugar in the morning before we go out to attend to our livestock. This helps us feel satisfied until night-time without feeling too hungry. This is a custom we picked up from urban residents.* (Man from Gode).

6.6.3.5 Ubiquitous availability and convenience of processed food

In all of the FG groups, the participants emphasised that imported processed food items have comparative advantages over local cereals in that they are widely available on the market throughout the year, are easy to prepare, and do not require a great deal of input to flavour them. On the other hand, local staple cereals, like maize and sorghum are apparently not always available on the market. Added to this, they need considerable time and firewood (or charcoal) to cook, and may be too bland for the modern palate, requiring the addition of expensive flavourings or butter. In addition, their availability is significantly influenced by seasonality. A woman from Gode suggested:

> *Every single shop in the town is stacked with imported food items like pasta, sugar, canned milk, and beverage drinks. But you can hardly find local cereals in these shops. You can only find these local cereals at a limited number of shops.*

The team of experts who participated in the mini-FGD conducted in Jijiga noted that despite their ubiquitous availability in the market, imported food items are mostly of an inferior quality. They explained that these foodstuffs are largely imported through informal contraband routes are hardly scrutinised by the government to ensure their quality.

6.6.4 Recent trends

In the last few years, young adults have started showing interest in the traditional foods due to the health concerns associated with the processed foods that are widely believed to be the cause of constipation and gastritis.

> *In recent days, gerow is making a comeback. Younger adults who are tired of constipation and gastritis are joining the elderly. There are many young adults who eat gerow for dinner* (Male from Gode)

Making use of the revival of interest in the traditional diets, some women have started a roadside business of preparing and selling these items. They prepare *soor, gerow, digir* (boiled and cooked beans), *and sareen (cooked white wheat) late in the afternoon, attracting many* male young adults and elderly. Women are not usually direct customers of the roadside food as it is not culturally acceptable for them to consume roadside food. However, men may buy take aways and share them with their family members.

The initiation of commercial camel farming in Jijiga is noted to have paved the way for the revival of camel milk consumption, which is regarded as a "super milk" among the Somalis because of its perceived medicinal value. An expert participant from the FGD in Gode explained that he foresees challenges ahead for the continued reliance of the community on imported foods from the global market:

> *We have the Shabelle river flowing on our land throughout the year. Rather than investing in it* (meaning in the development of the Shabelle river) *to produce our own food, we waste limited dollars to import processed foods from the global market. We will pay the price dearly for our exclusive reliance on imported foods to feed ourselves... We will obviously go hungry if we run out of US dollars or if the port or the road from Somalia are closed for some reason…. It is time for us to wake up from our deep sleep.*

6.7 CONCLUSION

The qualitative data collected from Addis Ababa and two towns of Somali region exhibited distinct features of dietary transformation. The analysis of the qualitative data appears to suggest that the westernisation of food is taking root in Addis Ababa, albeit the traditional foods are still dominant. This means, the food commodities widely consumed in Addis Ababa are sourced from domestic agricultural products, including grains, animal source foods, and fruit and vegetables, for example. On the one hand, the importance of fast foods and other western foods is gaining momentum due to an array of factors that accelerate nutrition transition. On the other hand, the transformation in towns of Somali region seems profound as the traditional diets are conspicuously replaced with new commodities from the global market.

In terms of the proposition of nutrition transition model, the nutrition transition in Addis Ababa seems to be intricately linked to factors related to demographic transition (age, gender, marital status), epidemiologic transition (perceived causes and consequences of NCDs), and economic transition (income, price, and affordability). The pace of change in dietary behaviour of people is further underpinned by dynamics related to social relationships in different settings, globalisation (opening of foreign restaurants, migration to other countries, technology-based information flow), and technology (digitalisation, and motorised movements).

In both Addis Ababa and Somali, there is a generational divide in terms of food choices between the younger generation and the older generation. The younger generation tend to prefer the newly introduced processed foods, while their preference inclines to traditional diets as age advances. Unlike the previous generations, children seem to play a decisive role in choosing the type of food they consume as far as their income level allows. Parents have to follow the preferences of their children rather than impose their choices as in the old days. In Addis Ababa, there is also a gender aspect of dietary transformation. In households where women are at the helm of decision-making, the family members are more likely to have nutritious food.

The dietary transformation in the Somali region of Eastern Ethiopia is characterised by a profound change that replaced the traditional foods of the community with imported processed foods from the international market network. This seems to be primarily linked to climate change in the area that led to the loss of crop harvests and took a considerable toll on the livestock population, the basis of the livelihood of the population. This is further compounded by socio-political factors, including the introduction of refined cereals by humanitarian agencies, the close ties with the population in Somalia, the preferred tastes, especially among the younger generation, and the ubiquitous availability and convenience of the imported foods. The urban population is now dominantly reliant on imported foods from the global supply chain network, which is available throughout the year. The younger generation, in particular, seems to regard the traditional foods in disdain, as they have become used to the taste of refined cereals (pasta, wheat flour, rice), vegetable oil, beverage drinks, and other factory-processed and packed foods. These items are increasingly displacing the traditional foods comprised of coarse cereals, milk, meat, and animal fats.

In both the Addis Ababa and Somali towns covered by the qualitative assessment, the recent years have seen behavioural changes that may slow the pace of nutrition transition trajectory down. In Addis Ababa, the perceptions about obesity are changing as it is no longer regarded as a blessing but as a problem. The attitude about traditional foods as a healthy dietary option is also widespread, despite the fast-food option, is also gaining ground due to an array of factors. In Somali towns, the traditional foods are making a comeback to the food scene. However, it seems that there is a revival of the traditional foods in response to the better awareness of the younger adult group of population about the health benefits of these foods, particularly in relation to constipation. In both places, however, it is still a concern that children and the youth continue to be the most important segment of the population consuming western foods and experiencing a sedentary lifestyle, that may predispose them to the jeopardies associated with the nutrition transition.

CHAPTER 7: SYNTHESIS OF THE MAIN ISSUES, CONCLUSIONS, AND RECOMMENDATIONS

7.1 INTRODUCTION

The main objective of this study is to examine the patterns and drivers of the nutrition transition in urban Ethiopia during the period 2000 and 2016 that overlaps with the rapid economic growth and urbanisation in the country. This chapter synthesises the results obtained from the quantitative (Chapter 5) and qualitative results (Chapter 6), the secondary data as discussed in Chapter 3, and the theoretical and empirical literature on the topic (Chapter 2). In this chapter, the question is asked and answered: What do the findings suggest about the nutrition transition trajectory in urban Ethiopia?

The first section of the synthesis entails patterns in quantities of dietary consumption in urban Ethiopia between 2000 to 2016. The second section deals with the drivers of dietary change. The nutrition transition is not only about dietary change, but it is also about the nutritional outcomes associated with the dietary changes. In the third section of this chapter, the researcher discusses issues related to the nutrition outcome (obesity and overweight) and its determinants. The fourth section examined the nutrition transition in the light of the related theoretical frameworks. The concluding section of this chapter is the conclusion and recommendations.

7.2 PATTERNS OF CHANGE IN DIETARY CONSUMPTION IN URBAN ETHIOPIA BETWEEN 2000 TO 2016

The first research objective of this study sought to examine the trends and patterns in the quantities of dietary consumption, household food consumption expenditure, and calorie intake derived from different dietary categories across socio-economic and demographic groups in urban Ethiopia for the period 2000 to 2016. Over the past two decades, Ethiopia has passed through profound socio-economic, political, demographic, and epidemiologic changes that are likely to shape the dietary consumption pattern and lifestyle of its people.

The period was characterised by the rapid economic growth and urbanisation, a significant decline in fertility and mortality rates, and elevation of the share of deaths caused by NCDs. These changes usually signify the situation on the ground are ripe for a nutrition transition to take place (Popkin & Ng 2022).

As clearly suggested by the FAOSTAT data and the HCES data presented in this study, the period between 2000 to 2016, saw a considerable increase in the average per capita dietary energy supply and consumption, implying that the rapid economic growth registered by the country during the 16-year period has translated into improving the dietary energy consumption of households. The production data from FAOSTAT suggests that annual cereal production has increased by 230% between 2000 and 2016, while the population grew by 56.4% during the same period. The per capita cereal supply that was lagging far behind the African and global averages before 2009, showed a substantial increase and either surpassed or remained at nearly the same level as the global average in the following years.

The period between 2000 and 2016 saw a considerable drop in the food budget share of starchy staples from 47% to 28%, in line with the basic proposition of the nutrition transition model. Similarly, the share of calories derived from starchy staples dropped from 81% to 65% over the same period. This clearly indicates that traditional sources of dietary energy are increasingly and rapidly being displaced/replaced by other food categories. The drop in the importance of starchy staples, which have been regarded as relatively cheaper sources of dietary energy in recent years, can be attributed to a shift towards more diverse and calorific foods. This might be due to changes in the food environment, such as an increased supply of alternative foodstuffs, changes in consumer tastes and preferences, and a drop in their relative pricing, underpinned by the rise in real income. Notwithstanding the steady fall, the share of cereals in the overall dietary energy in urban Ethiopia, which was reported as 56% in 2016 (HCES, 2016) is far above the corresponding figures in countries that reached advanced stages of the nutrition transition like the US (22%) and the UK (28%), as well as some African countries, such as South Africa (49%) and Kenya (54%) (FAOSTAT, 2016).

While the share of whole cereals, such as teff, coarse cereals, and wheat grain in urban Ethiopian households is dropping steadily, it is worth noting that the share of refined cereals that undergo industrial processing has climbed consistently from 5% in 2000 to 11% in 2016. The move to refined cereals, such as pasta, bakery bread, rice, and factory-processed flours, has been a fundamental feature of the 16-year nutrition transition in urban Ethiopia. The tendency to prefer consuming more refined cereals that undergo industrial processes instead of whole cereals, leads to the limited intake of fibre, micronutrients, and phytochemicals (Willett & Liu 2019). The dietary change from whole grains to refined cereals may imply that people are increasingly losing the potential benefits of consuming whole grains, such as the decreased incidence of and mortality resulting from cancer, type 2 diabetes, and cardiovascular disease (Tieri, Ghelfi, Vitale, Vetrani, Marventano, Lafranconi, Godos, Titta, Gambera, Alonzo, Sciacca, Riccardi, Buscemi, Del Rio, Ray, Galvano, Beck & Grosso 2020).

Households with a relatively higher-level standard of living tend to allocate a relatively lower share of their food budget to these basic staples, while poorer households tend to dedicate a larger share of their food budget to these items. The share of dietary energy derived from cereals and roots, tubers and stems decrease with the increase in the standard of living. The cost of calories consumed increases with income level, implying that richer households consume more calorific foods as a source of dietary energy than poorer households, who, in turn, rely on cheaper starchy staples. With an increase in income, food preferences are changing, even in what can be regarded as mainly traditional diets. For example, the shift from mixed teff, to white teff was notable with the rise in income.

Teff continued to be the dominant cereal consumed in urban Ethiopia. The average quantity of *teff* consumption plateaued between 2005 and 2016, however, its overall contribution to dietary energy is falling steadily. The consumption of coarse cereals, such as maize, sorghum, and barley exhibit a mixed trend. The consumption of roots, tubers and stems have increased progressively and, yet the overall dietary energy share remained between 3% and 4% during the period 2000 to 2016. The unabated roles of coarse cereals and roots, and tubers in the dietary pattern of urban Ethiopia indicate that dietary change is not taking place along a linear pathway, contrary to the basic tenets of the nutrition transition model (Popkin, Adair & Ng 2012).

Pulses continue to be important sources of plant-based protein, contributing between 6% and 7% of the overall dietary energy intake in urban Ethiopia. Ethiopia ranks sixth out of 186 nations in terms of the pulse supply (Kcal/per capita/day), trailing only Niger, Burkina Faso, Ruanda, and Burundi, according to FAOSTAT (2020). When compared to the United Kingdom and the United States, Ethiopia's per capita supply of pulses is approximately tenfold and fivefold, respectively. The ongoing dominance of pulses in the consumption pattern contradicts the nutrition transition model's proposed pattern (Popkin et al., 2012). This is an indication of the strong position *shiro*, a stew that is a staple of Ethiopian cuisine, which is prepared from roasted and powdered pulses, among both the affluent and the poorer households, according to both the quantitative and qualitative data. Notwithstanding the finding that the share of pulses in the total dietary energy is slightly lower among the wealthiest segment of the population, *shiro* continues to be an important vehicle for the consumption of pulses in urban Ethiopia.

While the vegetable intake exhibited a pronounced increase of 138% over the 16 years, although starting from an exceptionally low baseline in 2000, fruit consumption has remained at a fairly low level. The major sources of vegetable consumption in urban Ethiopia are onions, green leafy vegetables, and tomatoes. In 2016, vegetable and fruit consumption in urban Ethiopia was 208 grams/AE/day and 14 grams/AE/day, respectively, compared to the recommended daily intake of 400 grams of vegetables and fruit/person/day (WHO/FAO 2003). This is even lower compared to the recommendation of the EAT-Lancet Commission at 300-gram vegetables and 200-gram fruits (Willett, Rockström, Loken, Springmann, Lang, Vermeulen, Garnett, Tilman, DeClerck, Wood, Jonell, Clark, Gordon, Fanzo, Hawkes, Zurayk, Rivera, De Vries, Majele Sibanda, Afshin & Murray 2019) The FAOSTAT (2021) data further confirm that Ethiopia is among the bottom five countries in the world with regard to the supply of vegetables and fruit. Despite the finding that both poor and rich households allocate approximately similar shares of their household budgets to buying vegetables and fruit, the better-off households tend to consume larger quantities of vegetables and fruit.

The quantitative and qualitative data confirmed that the increased availability and accessibility of vegetable oil is an important driver of the nutrition transition for the poor and the rich in urban Ethiopia. While the amount and the corresponding share of the household budget allocated to fats and oils is declining over time, the total quantities consumed, and the calories derived from fats and oils are rising progressively, primarily because the real prices of fats and oils have declined. An increased vegetable oil consumption is regarded as an indicator of the existence of a nutrition transition (Drewnowski & Popkin 1997).

The contribution of dietary energy from fats and oils doubled from 7% in 2000 to 14% in 2016, implying households' increased reliance on these sources for their dietary energy, and displacing the traditional energy sources like starchy staples. Both the poorer and the richer households allocate 7% to 8% of their household food budgets to fats and oils. Vegetable oil is the main source, but butter still represents an important source as well particularly among the richer households. The large dietary shift observed in urban Ethiopia along with the edible oil consumption is in line with the developing world's dietary changes associated with the nutrition transition (Popkin 2009; Popkin 2003).

Particularly, the FAOSTAT data clearly suggest that palm oil constitutes the largest share (nearly three-fourths) of vegetable oil consumed in Ethiopia. Given that palm oil has a saturated fat content that is higher than other vegetable oils, the increased level of its consumption may be associated with an increased risk of NCDs, such as cardiovascular diseases (Chen, Seligman, Farquhar & Goldhaber-Fiebert 2011; WHO & FAO 2003) and atherogenic low-density lipoprotein cholesterol (Sun, Neelakantan, Wu, Lote-Oke, Pan & Van Dam 2015). Unlike the nutrition transition trajectory in developed countries that was driven in part by the increased consumption of animal fats (Drewnowski & Popkin 1997), the change in the consumption of animal-sourced fats, such as butter (extracted mainly from cow's milk) has been modest. The consumption of butter is linked to the level of income of households, while vegetable oil is consumed by both the richer and the poorer households, implying that income is not a predictor of the consumption of vegetable oil.

Although the consumption of fats and oils rises steadily in urban Ethiopia, the consumption level is still far below that of countries that have undergone a nutrition transition. For example, the FAOSTAT data for the year 2016 suggest that the availability of the calories per capita derived from fats and oils in Ethiopia represents only 12% of that of the US, 17% of that of the UK, 73% of that of Kenya, 32% of that of Djibouti, and 26% of that of South Africa. Added to this, the fat-to-energy ratio (FER), the share of energy derived from fats out of the total dietary energy (in kcal), that was standing at 14% in 2016, which was deemed low compared to the recommendation of FAO experts' group that set the total fat at between 20% to 35% of the total energy intake for acceptable macronutrient distribution range (FAO 2010). The deduction is that, while fats and oils (especially, relatively cheaper vegetable oil) are driving the nutrition transition process in urban Ethiopia, consumption levels remain below the threshold to cause a conspicuous nutrition transformation.

In terms of the consumption of partly hydrogenated oil, a significant carrier for trans-fat, HCES data indicated that the consumption in urban Ethiopia reached nearly zero in 2016, down from an incredible 6% in 2000. Because hydrogenated oil is often used to increase the texture, taste stability, and shelf-life of commercially baked products like cakes, cookies, pies, biscuits, and fried meals, like French fries, consumption of these items away from home may have been underestimated in the survey. However, the overall intake of these foods is negligible.

Notwithstanding the average quantities of ASF consumed saw a 47% increase, from 17kg/PAE/year to 25kg/PAE/year, the share of dietary energy derived remained more or less stable at around 2% during the period 2000 to 2016. Despite starting from a low baseline, the meat consumption level is rising in urban Ethiopia with a corresponding increase in income. The major sources of ASF consumption in urban Ethiopia are milk, beef, and mutton/goat. The disparity in the share of expenditure on ASF between poorer and wealthier households is significant. The percentage of food budget spent on ASF continually increases as household incomes increase, implying that ASF are the diets favoured and consumed mostly by the more well-off households, whereas poorer households prefer to spend their limited resources on less expensive dietary energy sources.

Unlike the dietary shift in developed countries, which is dominated by processed meat (Sievert, Lawrence, Naika & Baker 2019), traditional Ethiopian foods (*kurt, kitfo,* and *tibs*) are gaining traction. The intake of ASF is still quite low in comparison to the optimal level for the nutritional wellness of humans, and it is even lower in comparison to the SSA average.

Given that Ethiopia is the nexus of all forms of malnutrition (that is, the country suffers under the triple burden of malnutrition, namely, undernutrition, micronutrient deficiency, and overweight/obesity), increasing the consumption of ASF in the coming years holds both positive and negative consequences for the health outcomes of the population. Because ASF are key sources of high-quality essential proteins, lipids, and micronutrients, their sustained increase helps in mitigating widespread malnutrition. On the other hand, it may be a cause of increased health risks for high-income people who are currently consuming significantly more ASF than is recommended.

The slow but steady increase in the adaptation of western diets prepared from processed meat such as hamburger patties, or hot dog sausages are specifically concentrated in higher income groups and with the younger generation. Research findings associated the excessive consumption of red and processed meat with a high risk of obesity (Vergnaud, Norat, Romaguera & Mouw 2010; Wang & Beydoun 2009), type 2 diabetes (Pan, Sun, Bernstein, Schulze, Manson, Willett & Hu 2011, colorectal cancer (Lippi, Mattiuzzi & Cervellin 2016), other types of cancer (Cross, Leitzmann, Gail, Hollenbeck, Schatzkin & Sinha 2007) and cardiovascular diseases (Micha, Wallace, & Mozaffarian 2010).

Excessive consumption of red and processed meat within this specific population group may expose them to disproportionately increased risks of various NCDs.

The consumption and hence the calories derived from sugar nearly doubled between 2000 and 2016, despite its contribution to overall dietary energy remaining more or less stable (3% to 4%), and still being far below the 10% ceiling recommended by the WHO (2020a). This implies that the increase in the consumption of sugar and sweetened foods is one of the key features of the dietary transition in urban Ethiopia. The average sugar intake is on par with Sub-Sahara Africa countries such as Nigeria, Chad, Sierra Leon, Ruanda, Chad, and Cameroon (Nel & Steyn 2022). However, when compared with the sugar calorie consumption in United States and the United Kingdom, urban Ethiopians consume only about 15% and 30%, respectively. Ventura and Mennella (2011) suggest that the preference for sweetened foods is not just a result of modern technology (for example, greater access) and aggressive marketing and advertising, but also the outcome of brain mechanisms underlying the strong pleasure response to sweet tastes. The rise in the consumption of sugar and sugar-sweetened foodstuffs thus increases over generations and can be expected to rise even further in urban Ethiopia.

UPF are regarded as vehicles for the consumption of energy-dense fats, saturated fats, trans-fats, and sugar, salt, and nutrient- and fibre-poor diets (Monteiro, Cannon, Lawrence, Costa & Pereira 2019; Monteiro 2009). The consumption of cakes, cookies, biscuits, fried dough snacks (like doughnuts, or samosas) is still exceptionally low in urban Ethiopia and did not exhibit a significant change from 2005 to 2016. During the same period, the average household expenditure on these western foodstuffs remained below 1% of the food budget of households. The consumption of ultra-processed foods (UPF) constitutes an exceedingly small proportion of the household budget, and the calories derived from UPF are insignificant. Nonetheless, the trend has been increasing, albeit slowly, between 2000 and 2016. Between 2005 and 2016, UPF accounted for 2% to 3% of the total dietary energy consumed by urban Ethiopian households.

The most important UPF consumed in urban Ethiopia are fast foods (pizzas, burgers, or sandwiches) and carbonated, sweetened soft drinks. UPFs constitute a substantial share of the dietary energy consumption of countries that have reached pattern 4 in Popkin's nutrition transition framework. UPFs represented around 58% of the average US daily energy intake in 2009–2010 (Martínez, Popkin, Swinburn & Monteiro 2017). According to the data compiled by Mertens, Colizzi and Peñalvo (2022) the contribution of ultra-processed foods and drinks to the overall dietary energy varied markedly across European countries. For example, the share of these groups represented 29% in France (2014), 43.8% in Sweden (2010), and 41.3% in the UK (2008).

There is a growing body of evidence suggesting that excessive consumption of UPF is associated with a higher risk of obesity, cardiovascular diseases, different types of cancers, and type-2 diabetes (Pagliai, Dinu, Madarena, Bonaccio, Iacoviello & Sofi 2021; American Institute for Cancer Research 2018; Canella, Levy, Martins, Claro, Moubarac, Baraldi, Cannon & Monteiro 2014; Basu, McKee, Galea & Stuckler 2013). The relatively small role that UPFs play in the overall dietary consumption in urban Ethiopia means that Ethiopia has a small window of opportunity to reverse the looming risks associated with a nutrition transition that can result in poorer health outcomes due to the overconsumption of UPFs.

The consumption of carbonated, sweetened soft drinks, regarded as the major vectors of a sugar-accelerating nutrition transition in many developed and developing countries (Baker & Friel 2014) does not seem to have a significant effect in urban Ethiopia. As suggested by the HCES data, the consumption of these items is exceptionally low and is generally declining. For example, the annual consumption of soft drinks that was reported to be around 10 litres PAE in 2016, was exceptionally low when compared to countries at an advanced stage of the nutrition transition, such as the US (154 litre per capita), Belgium (272 litre per capita), or the UK (105 litre per capita) (Yahoo Finance 2023). According to the data published by Statista for the year 2018, the values of soft drinks consumption in Nigeria (4.6 billion USD), South Africa (1.1 billion USD), Kenya (417 million USD), Sudan (162 million USD), and Uganda (144 million USD) are far higher than the corresponding value in Ethiopia (32 million USD) (Statista Search Department 2023). Putting these numbers in per capita terms, the consumption in Ethiopia stands at 0.3 USD as compared to South Africa (18.5 USD), Kenya (7.8 USD), Nigeria (6.8 USD), Sudan (3.7 USD), and Uganda (3.7 USD).

7.3 HOUSEHOLD-LEVEL DETERMINANTS AND DRIVERS OF THE NUTRITION TRANSITION IN URBAN ETHIOPIA

The second research objective of this study was to identify household- level determinants of the nutrition transition in urban Ethiopia. The findings explored both the determinants of the consumption of different food categories and the drivers of change in the consumption of different food categories between 2000 and 2016. This section discusses the determinants of consumption and drivers of change identified in the quantitative and qualitative data.

7.3.1 Determinants of consumption of food categories

The empirical analysis showed that the socio-economic and demographic characteristics of households shape the food consumption pattern in urban Ethiopia. The age of the household head is found to have different effects on the consumption of different food categories. Households headed by younger people tend to consume more refined cereals (although less absolute calories), lesser quantities of ASF, more calories from UPFs, and lesser dietary energy from fats and oils. The consumption of vegetables decreases in the middle age groups, and then increases with the age of the household head. Households with older heads tend to consume more ASF, oils and fats, and vegetables than households with younger heads. The inverse relationship between age and UPF consumption was further confirmed in the qualitative assessment of this study and the studies in Colombia (Khandpur, Cediel, Obando, Jaime & Parra 2020), and in the US (Baraldi, Martinez, Canella & Monteiro 2018).

The positive relationship found between the proportion of calories obtained from fats and oils and the age of the household head contradicts expectations that older individuals consume fewer fats and oils than younger people due to health concerns. A similar pattern of age and the intake of fats and oil was observed in Malaysia (Cheah, Abdul Adzis, Abu Bakar & Applanaidu 2021) and Switzerland (Marques-Vidal, Waeber, Vollenweider & Guessous 2018).

Female headship is associated with the relatively higher consumption of ASF, vegetables and fruit, refined cereals, and fats and oils. Households that have women as the key decision-makers for the purchase, preparation, and consumption of food, tend to spend a larger share of their household food budget on these food groups. This may be explained by the greater awareness of women of the health benefits of these foods for their family and being more aware of body weight issues. Moreover, their headship of the households gives them the command over the utilisation of available resources at their disposal on nutrient-dense foods, including ASF and vegetables and fruits. On the other hand, male-headed households tend to consume larger amounts of UPFs.

The analysis of this study clearly suggest that the marital status of the household head is significantly correlated with the dietary consumption pattern of households. Households headed by never-married people tend to consume relatively fewer cereal-based calories, but they still have a relatively larger share of their cereal-derived calories from refined cereals. Never-married heads of households rely more on food sources other than cereals than the other marital categories. Households that have married heads are more likely to consume larger amounts of ASFs, vegetables, and fats and oils. This may be because marital life is likely to create a social and physical environment conducive to the preparation and consumption of meals at home.

On the other hand, households that have never-married household heads may lack cooking facilities or time. Never-married heads of households have a higher probability of consuming larger amounts of UPFs, implying that these categories are more likely to consume fast foods. Mouttapa and Wallace (2017) and Kroshus (2008) also concur that married individuals have healthier dietary consumption patterns than unmarried individuals.

As the income of households rise, they tend to shift from the traditional starchy staples to the consumption of calorific foods, including ASFs, vegetables and fruits, and UPF. The qualitative data, on the other hand, suggested that the income level determines the type of UPF people consume from a wider range of choices available in the market. Low-income earners are linked to the greater consumption of soft drinks, fried foods, and cheap ready-to-eat meals, but high-income earners tend to consume expensive UPF such as pizzas, burgers, or cakes. Studies from Kenya, Tanzania, and Uganda (Sarfo, Pawelzik & Keding 2021) and some Latin American countries, such as Colombia (Khandpur et al. 2020), Brazil (Simes, Cardoso, Benseor, Schmidt, Duncan & Luft 2018), and Chile (Cediel, Reyes, Louzada, Steele, Monteiro & Corvalán 2018) show a positive relationship between the socio-economic status and UPF consumption, similar to the pattern observed in urban Ethiopia.

The opposite is true in industrialised nations such as the US (Baraldi, Martinez, Canella & Monteiro 2018) and the UK (Adams & White 2015). The household intake of fats and oils (quantity and percentage of dietary energy) increases with income level but decreases somewhat for the upper 20% of families, indicating that the connection is not linear in urban Ethiopia. In summary, this may mean that a rising household income allows them to buy more food, but this can be nutrient-dense foods, such as, ASF and fruits and vegetables, or calorie-dense and nutrient-poor foods, such as, UPF, fats and oils, and processed cereals, which might undermine the diet quality.

A significant positive relationship was found between the level of education attainment of the household head and the consumption of refined cereals, ASF, vegetables and fruits, and fats and oil. Households headed by tertiary education attainers and those without any formal education are consumers of relatively larger dietary energy from UPF. The mixed relationship emerged between level of education and consumption of ASF contrasts with preferences for UPF over fresh and minimally processed meals by those having fewer years of formal education in Brazil (Lopes da Rocha, Silvério, Fortins, Santos, Carmo, Da Costa, Luescher & de Carvalho Padilha 2021) and the US (Baraldi, Martinez, Canella & Monteiro 2018).

7.3.2 Drivers of nutrition transition over the period between 2000 and 2016

This section seeks to explore the drivers of change over the period under consideration based on the decomposition analysis of the quantitative data and qualitative in this study. Food prices are assumed to have a considerable influence on food consumption, boosting or reducing certain types of food items (Duffey, Gordon-Larsen, Shikany, Guilkey, Jacobs & Popkin 2010). During the period under consideration, the real prices of items that characterise a nutrition transition, such as factory-processed wheat products, edible oils, sugar, and beer, declined while the real prices of nutritious foods such as *teff*, ASF, fruits and vegetables, and lentil rose. These price trends may incentivise the dietary transition from nutritious diets to energy-dense, but nutrient-poor diets.

The decomposition procedure applied, helped to identify the factors that may have contributed to the change in consumption of different food categories and the levels of overweight/obesity between 2000 and 2016. The period was characterised by a massive decline in the share of calories derived from starchy staples and substantial increases in dietary energy from fats and oils (particularly from edible oils). The consumption of ASF, fruits and vegetables, and UPF also showed a sizable increase during the same period.

The 51% increase in the real income recorded between 2000 and 2016, as measured by real expenditure PAE, is found to be the most important driver behind the increase in the consumption of ASF (148%), vegetables and fruits (14%), refined cereals (21%), and fats and oils (14%). This clearly shows the importance of improved economic well-being in accelerating the dietary shift for a nutrition transition. The 16-year period saw a considerable transformation in the educational attainment of the household heads. The transformation in the level of education attained by the household heads is the second most crucial factor that drove the change in the consumption of refined cereals (10%), ASF (48%), vegetables and fruit (8%), and fats and oils (13%).

The fertility transition in urban Ethiopia, which is manifested by the shrinking in the mean household size from 4.6 in 2000 to 3.7 in 2016, contributed around 6% and 9% of the increased consumption of vegetables and fruit and UPF, respectively. The contracting of household sizes over the period under consideration may enable households to afford more vegetables and fruits. The change in the consumption of UPF is shaped significantly by the age of the household head and the overall ages of the household members. It is particularly worth noting that the change in the level of education attained by the household heads, that has contributed substantially to the increased consumption of other food categories (refined cereals, ASF, VF, and fats and oils) in this study, have a small but depressing effect on the change in the consumption of UPF over the 11-year between 2005 and 2016.

Except for the change in the consumption of ASF, which is largely attributable to the change in the economic well-being of households, the changes in the other food categories remained largely unexplained (more than 50% of the change) by the socio-economic and demographic variables in the models. This means that the increase in the consumption of refined cereals, vegetables, and fruits, UPF, and fats and oils over the period under consideration is largely due to changes in factors outside the household characteristics.

The change in the food environment in urban Ethiopia that increased the availability and use of cereals over time is more likely to have explained the increased consumption. The urban wheat subsidy and the subsidised vegetable oil programme introduced by the Government of Ethiopia in 2008 may have played a significant role in changing the food environment. Since 2008, the Government of Ethiopia has procured large amounts of wheat from the international market and sold it to flour mills at subsidised prices. The flour mills, in turn, sold the wheat flour to bakeries or consumers' cooperatives at fixed prices. Copious amounts of palm oil imported mostly from Asia, were also provided at subsidised prices to consumers through cooperative associations' outlets. The change in the overall food environment that made fruit and vegetables and UPFs available and accessible for people in urban Ethiopia, are at the root of the increased consumption of UPF.

According to the qualitative data, factors such as food availability and accessibility, opportunity cost of time to process, affordability (income), and marketing through social and mainstream media all contribute to the observed shift towards the increased consumption of refined cereals, such as wheat bread, instant noodles, and pasta. This is consistent with the 'food environment' concept, which identifies both internal and exterior domain characteristics that influence how people interact with food sources to get and consume food (Turner, Aggarwal, Walls, Herforth, Drewnowski, Coates, Kalamatianou & Kadiyala 2018).

Dietary transformations in the Somali region of eastern Ethiopia have been marked by significant substitutions of traditional foods, such as coarse grains, milk, meat, and animal fats with processed commodities imported from global market networks. This appears to be largely driven by climate change in the region, which has resulted in low agricultural productivity and the loss of livestock, threatening the livelihoods of the community. This is in line with the assertion that climate change has the potential to harm food security and diet quality, as well as expose vulnerable populations to different forms of malnutrition (Owino, Kumwenda, Ekesa, Parker, Ewoldt, Roos, Lee & Tome 2022).

Added to this are socio-political factors, such as the introduction of refined grains by humanitarian aid groups, close ties with the Somali people, taste preferences, and the availability and convenience of imported foods. Morgan and Fanzo (2020) observed a similar trend in Nigeria due to climate change in Northern Nigeria. Consequently, Nigeria could not produce enough cassava, cowpeas, and sorghum to feed its population partly due to desertification and drought, and had to rely on imports of rice, wheat, fish, milk, and tomatoes to cover the shortfall (Morgan & Fanzo 2020).

The qualitative data analysis appears to indicate that the westernisation of diets is gaining traction in Addis Ababa, yet indigenous dishes remain dominant. This indicates that the majority of the food commodities consumed in Addis Ababa are derived from local agricultural products, such as cereals, animal source foods, fruits, and vegetables. On the one hand, the prominence of fast foods and other Western foods is growing as a result of array of factors that hasten the nutrition transition. The emerging food culture appears to be used as a coping mechanism to deal with the constraints of modern life related to working arrangements, a lack of time and space to prepare meals, and the prohibitively high pricing for traditional foods. As a result of these issues, the growing food culture includes eating away from home, depending on ready-to-eat convenience foods, and snacking on street stall prepared foods.

As suggested by the qualitative data, the nutrition transition appears to be closely correlated with factors related to the demographic transition (age, gender, and marital status), epidemiologic transition (perceived causes and consequences of NCDs), and an economic transition (income, price, and affordability), in compliance with the nutrition transition model (Popkin 2008). The dynamics of social relationships in various contexts, globalisation (the opening of foreign restaurants, immigration to other countries, the flow of information based on technology), and technology (digitalisation, and motorised movement) drive the pace of change in the nutrition transition in urban Ethiopia. These factors comply with the drivers of the nutrition transition mentioned by Popkin (2006).

7.4 PATTERNS OF ADULT OBESITY AND OVERWEIGHT AND THEIR DRIVERS IN URBAN ETHIOPIA

The third research objective of this study was to examine the patterns of adult obesity and overweight and their determinants in urban Ethiopia. The period between 2000 and 2016 saw a significant increase in the level of overweight and obesity among both male and female adults in urban Ethiopia. The proportion of overweight and obese adult women increased from about 12% in 2000 to 22% in 2016, which is consistent with the change in diet and increased calorie consumption over time. The male overweight prevalence increased from 7% to 11% between 2011 and 2016, while the male obesity prevalence rose from 1% to 2% during the same period. Although the increase can be regarded as relatively fast, the level of overnutrition is exceptionally low compared to other developed and developing countries.

According to the data published by the NCD Risk Factor Collaboration (NCD-RisC2016), Ethiopia ranks 197th and 188th out of 200 countries globally in terms of the prevalence of adult men and women with obesity, respectively. This result suggests that the nutrition transition in Ethiopia is still at a nascent stage. Overweight and obesity are associated with a higher risk of NCDs, such as cardiovascular diseases (mainly heart disease and stroke), diabetes, musculoskeletal disorders, some cancers, such as endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and colon cancer (WHO 2021). The relatively low prevalence of obesity and overweight among Ethiopian adults, if addressed timeously using the appropriate policy tools, presents a chance to mitigate the exigencies linked to obesity and overweight.

Women are more likely than men to be obese in urban Ethiopia (6% versus 2% in 2016). This is consistent with the overall global pattern that indicates a higher risk of obesity among women compared to their male counterparts (Kapoor, Arora, & Kalra 2021). In 2016, around 11% of adult males and 15% of adult women worldwide were obese (NCD-RisC 2016). Addis Ababa, Diredawa, Harari, and their nearby surrounding areas are notable for having a persistently contiguous clustering of overweight/obesity prevalence. These are regions of the country with relatively advanced levels of urbanisation.

Multiple studies suggest that obesity is significantly associated with a higher chance of having COVID-19 complications (in terms of increased severity) (Gao, Zheng, Wang, Sun, Pan, Wang, Chen, Targher, Byrne, George & Zheng 2020; Katzmarzyk, Salbaum & Heymsfield 2020; Caussy, Pattou, Wallet, Simon, Chalopin, Telliam, Mathieu, Subtil, Frobert, Alligier, Delaunay, Vanhems, Laville, Jourdain & Disse 2020; Kalligeros, Shehadeh, Mylona, Benitez, Beckwith, Chan & Mylonakis 2020) and mortality (Klang, Kassim, Soffer, Freeman, Levin & Reich 2020). This implies that obesity is not only related to degenerative NCDs, as suggested in the nutrition transition framework (Popkin 2006a), but it is also associated with COVID-19, a highly contagious and virulent virus that spread swiftly over the globe, causing serious disease and extensive social and economic problems.

In addition to the health consequences, obesity also has huge economic costs. As the country is struggling with the double burden of malnutrition, treating obesity and obesity-related conditions costs a great deal in terms of resources to treat the situation related to undernutrition. According to the regression analysis of the EDHS pooled data, the higher ages of women, the marital status, employment in professional, technical, and managerial jobs, watching television at least once a week, vehicle ownership, a higher wealth index, and the attainment of primary and secondary education all increase the risk of being obese/overweight.

The decomposition of the EDHS data helped to identify socio-economic and demographic factors that underlie the observed change in the level of overweight and obesity in urban Ethiopia. The major drivers that explained part of the rising prevalence of overweight/obesity in urban Ethiopia are a growing trend of women spending their leisure time watching television, the increase in the level of educational attainment, the demographic transition characterised by the decline of younger age groups and the ballooning of the percentage of women of older ages, the shift in women's occupation from manual activities, such as agriculture, to professional, technical, managerial, and other occupations. These changes during the inter-survey period may have affected obesity through pathways that affect dietary consumption and level of activity. This may indicate that the general atmosphere in urban Ethiopia is becoming increasingly obesogenic, but to a lower extent than in developed and most developing countries.

7.5 CHARACTERISTICS OF THE NUTRITION TRANSITION IN URBAN ETHIOPIA

Research objective four of this study aimed to develop a model to describe the unique characteristics of the nutrition transition in urban Ethiopia and to recommend policy options to mitigate negative exigencies. This section examines the study's findings using theoretical frameworks linked to the nutrition transition. Popkin's nutrition transition framework was used to analyse where urban Ethiopia is situated presently, including the stage of nutrition transition, the behavioural change, the generational divide, and whether there is convergence with western diets. The next sub-sections address the dietary transition in urban Ethiopia in the light of the sustainable food system and food sovereignty.

7.5.1 Where is urban Ethiopia with regard to the nutrition transition?

Although Popkin's nutrition transition framework includes five distinct stages, the term "nutrition transition" is widely applied to refer to the transition from stage three to stage four, whereby people move from a receding famine stage that is characterised by diets dominated by starchy, low fat and high fibre to the chronic disease stage with a diet high in total fat, cholesterol, sugar, and other refined carbohydrates (Breewood 2018, Popkin & Du 2003). This study applied Popkin's framework to interpret the nutrition transition that urban Ethiopia is undergoing.

The findings of this study have shown convincingly that different socio-economic and geographic groups in urban Ethiopia are experiencing a nuanced nutrition transition heterogeneity. Households with better incomes/levels of wealth tend to consume a higher proportion of fats and ASF and concomitantly have higher levels of overweight/obesity prevalence, while households at lower levels of income/wealth are consuming diets dominated by starchy staples and achieve lower levels of obesity/overweight. This means that households at lower levels of income/wealth status tend to fall under the receding famine level (stage three), with a high probability of transforming to the next stage (stage four) as their standard of living increases. The study conducted by Reardon, Tschirley, Liverpool-Tasie, Awokuse, Fanzo, Minten, Vos, Dolislager, Sauer, Dhar, Vargas, Lartey, Raza & Popkin (2021) suggest similar trends in most Sub-Saharan African countries. Given the complexity of human behaviour, it is difficult to assert whether the dietary change in urban Ethiopia fits a simplistic linear progression perfectly as suggested by Popkin (2006).

7.5.2 Is behavioural change taking place against the progression towards the nutrition transition?

Popkin's hypothesis of the shift from chronic diseases (stage four) to behavioural change (stage five) is yet to be seen even in developed countries, due to the fact that the prevalence of obesity continues unabated. For example, the prevalence of overweight and obesity in the US (Li, Gong, Wang & Li 2022), the UK (Baker, C. 2023), and European countries (WHO European Regional Obesity Report 2022) continued to rise despite more than two decades' progress along Pokin's suggested model of behavioural change pattern. No country has been able to reverse the upward trend of obesity, and Popkin and Ng (2022) suggest that there is a chance to leapfrog stage 4 and reach stage 5 should there be "*the right mix and sequencing of long-term national policies.*"

Although western diets that are considered as vehicles that facilitate the nutrition transition are increasing slowly, and the concomitant prevalence of adult overweight and obesity continue to rise, there are indications that behavioural changes are taking place countering the trajectory pursued by the Western countries. It is challenging to predict the trajectory of dietary change in Ethiopia with absolute precision because of the array of cultural, religious, tastes and preferences, health considerations, and other social factors that undergird it. The strength of these factors to counteract the forces exerted by new dietary values and driven by urbanisation, internet-based promotions, economic growth need to be evaluated independently.

Recent years have seen glimpses of behavioural changes in both Addis Ababa and the Somali communities as indicated by the qualitative data, which may delay the rate of the nutrition transition trajectory. In Addis Ababa, there are signs that the perception of obesity is changing since it is no longer regarded as a blessing, but as a health burden. Traditional meals are often regarded as a healthier nutritional option, despite the fact that fast food is gaining traction. Traditional Somali cuisine is making a comeback in the food environment of the Somali communities. It appears that Somali traditional foods are witnessing a revival as a result of an increased awareness among the younger adult population of the health benefits of these meals, particularly in connection with constipation. However, there is still a concern in both areas because children and the youth continue to be the most significant part of the population consuming Western foods and leading sedentary lifestyles, which may predispose them to the risks connected with a nutrition transition.

As is typical of the "global" marketing strategy of trans-food corporates (Hawkes 2003), global corporates have been supplying the Ethiopian market with partially hydrogenated oils that have a high trans-fat content, popular brand names, and advertising claiming that these alternatives enhance or exceed culturally desirable tastes for spiced, buttery foods. Although the consumption of such products high in artificial trans-fats was significant in 2000 (constituting as much as 6% of the dietary energy), its consumption nosedived in the following years and reached almost zero in 2016. This may mean that the hydrogenated vegetable oils are losing its popularity in urban Ethiopia and that consumers are replacing it with liquid vegetable oil. The wider publicity by the mainstream and informal media about the cardiometabolic health risks associated with hydrogenated fats might have played a depressing role in the consumption of the product. If the decrease is related to the behavioural response of the public to the health messages, future interventions should draw lessons from this strategy to counter the negative effects of a nutrition transition.

To conclude, the observed behavioural changes in urban Ethiopia may indicate that there is still room to delay the pace of the nutrition transition and its detrimental repercussions. Nonetheless, given the strong forces driving a nutrition transition (for example, preferences for sweetened and fatty foods, appealing advertisements, a sedentary lifestyle, the ubiquitous availability of cheaper foods driven by income growth, urbanisation, labour force participation, and technological change), it is difficult to halt the progression to stage-four of nutrition transition in urban Ethiopia. Despite Popkin's notion of a fifth step (behavioural change), no country has yet achieved this stage, and urban Ethiopia is unlikely to achieve this stage in the near future.

7.5.3 Is urban Ethiopia converging with western diets?

One of the tenets of the nutrition transition is the convergence of global diets with Western diets characterised by the high intake of refined carbohydrates, added sugars, fats, and animal-source foods (Popkin & Gorden-Larsen 2004). This sub-section examines to what extent the dietary consumption in urban Ethiopia is converging with that of the patterns observed in developed countries that underwent a nutrition transition to stage 4 (diet related NCDs).

The quantitative and qualitative findings consistently revealed that western diets are infiltrating urban Ethiopian consumption patterns progressively. Western diets, hitherto unknown to the public, are gradually making their way into the food landscape of urban Ethiopia. The most noticeable consumption trend is the increased consumption of refined cereals (especially wheat flour, bakery bread, and pasta) and vegetable oils. The consumption of these two food commodities is increasing in line with the assertion of the nutrition transition model.

Although ASF consumption is on rise, there is no trend suggesting that traditional meat consumption is being replaced with western-style processed meat diets such as bacon, sausages, pepperoni, ham, and corned beef. Cultural dishes prepared from raw beef, such as *kitfo* and *kurt,* that are apparently not known in the Western world, are gaining popularity as the income levels of households grow. The traditional way of consuming meat and other ASF continues to dominate without converging with the Western form.

However, western diets are still available, albeit in limited quantities, underpinned by the increased availability of information on the internet concerning the preparation, types, availability, price, and delivery mechanisms for such food. As Hawkes (2006) points out, the globalisation of diets can occur due to factors related to fast-food outlets, foreign direct investment, and global food advertising. Despite the proliferation of supermarkets and food courts in urban Ethiopia, the industry has not been liberalised to allow foreign corporations to engage in retailing business. As indicated in the qualitative data, western diets, such as burgers, pizzas, or cakes are still largely unaffordable for the lower income groups. Given that traders producing and selling such hyperpalatable products are mostly individual traders, they do not have the comparative advantage of large transnational food companies (TFCs) that produce, distribute, and sell their products at lower prices (Hawkes 2006).

The liberalisation of certain sectors related to the manufacture of beer and soft drinks have apparently dominated the market by providing competitive products at cheaper prices but with greater convenience, which depressed the demand for traditional drinks. While the consumption of traditional diets prepared from cereals rich in fibre and pulses continue to dominate the consumption pattern in urban Ethiopia, the adaptation of "Western diets" as posited in the nutrition transition model, is creeping in slowly.

7.5.4 Generational divide and the nutrition transition in urban Ethiopia

The growing propensity observed towards western diets, particularly among the younger generation, may contribute to the existing generational divide in food choices between the younger and older generations. As indicated in both the quantitative and qualitative data, the younger generation tends to prefer foods that are energy-dense and nutrient-poor, ultra-processed, rich in saturated fats, salt, and sugar, whereas people from older generations tend to stick to the traditional diets dominantly ASF, starchy staples, legumes, and other diets rich in fibre and micronutrients. Ethiopia has a mostly young population, with 59% of the population under the age of 25 in 2020 (World Development Indicators). The favourable attitudes towards Western diets among the younger generation is a cause for concern as it is likely to determine the future of the food landscape and the pace of the nutrition transition and its ramifications.

7.5.5 Dietary transition in urban Ethiopia and sustainable food systems

The past two decades have seen the rapid urbanisation and economic growth underpinned by high population growth, infrastructure expansion (including road and communication), structural changes in demographic and epidemiologic features, and a transformation in the food system in urban Ethiopia. The crop production system is increasingly focused on the intensification using fertiliser, pesticides, and herbicides. In Ethiopia's food system, the food and beverage processing industry, which comprises sugar and sugar confectioneries, bakeries, grain milling, biscuit making, soft drink production, beer brewing, mineral water, and edible oil is expanding (Soethoudt, Van der Riet, Sertse & Groot, 2013).

The food distribution landscape is changing with the introduction of global food choices hitherto uncommon to the local food list underpinned by the proliferation of domestic modern private retail sector outlets, including supermarkets, bakeries, food courts, convenience shops, street-vendor fast food and ready-made meals (Minten, Dereje, Bachewe & Tamru 2018). The transformation of consumption patterns is characterised by:

- The increased overall calorie consumption among the poor and rich.
- A decreased share of dietary energy derived from starchy staples.
- The increased consumption of refined cereals, vegetable oils, vegetables, and fruit, ASF and UPF, with notable differences between the rich and the poor. These changes have ramifications for the food system's sustainability from an environmental, social, and economic standpoint, with repercussions for the present and future generations' health and well-being.

Ethiopia's population is expanding, and it is critical to raise the output accordingly to feed the people and fulfil the growing demand due to increased incomes and changes in consumption patterns. The agricultural sector in Ethiopia has undergone significant changes with increased investments in modern farming technologies, irrigation systems, and high-yielding crop varieties (Minten, Dereje, Bachewe & Tamru 2018). To fulfil the increasing demands, it is necessary to produce more food, enhance the production quality, and diversify production, while maintaining environmental sustainability. Chemical fertilisers (Minten et al. 2018) and agrochemicals (Tamru, Minten, Bachewe & Alemu 2017) used on smallholder agriculture and commercial farms have increased multiple fold over the last two decades to boost agricultural productivity. Despite their benefits in increasing the production and limiting the expansion of farmland to forestland, the increased use of chemical fertiliser to increase food production, increases environmental pollution, including greenhouse gas emissions, drinking water contamination, and the eutrophication of freshwater systems and coastal zones (UNEP, 2022). According to FAOSTAT (2021), synthetic fertilisers contribute about 2% of the agricultural greenhouse gas emissions in Ethiopia. Only a small portion of the hazardous agrochemicals used in agriculture actually reach the targeted weeds, diseases, and pests, and the remainder harm valuable living organisms in the ecosystems by contaminating the nearby soil, air, and waterbodies (UNEP 2022).

The global transition to sustainable food production is crucial for attaining the United Nations' 2030 Sustainable Development Goals (SDGs), which include eradicating poverty and hunger (SDG 2), improving health (SDG 3), ensuring clean water and suitable sanitation (SDG 6), fostering economic growth (SDG 8), enhancing responsible production (SDG 10), preserving life below water (SDG 14), and life on land (SDG 15). The consumption pattern of the developed countries, particularly the industrial production and consumption of meat, runs counter to the SDG 2 goal of ending all forms of malnutrition. In addition, it jeopardises public health (SDG 3) and environmental health (SDG 6, SDG 14, and SDG 15). As the nutrition transition in Ethiopia is at an early stage, it is critical to review the agricultural production and consumption patterns and ensure sustainability before the point of no return is reached.

The observed trend seems to suggest that the demand for ASF is likely to increase in urban Ethiopia with the increase in income levels, which may lead to the expansion of the livestock sector in Ethiopia. Given that the current level of ASF consumption is exceptionally low (which constitutes around 2% of the total average dietary energy intake), increasing consumption is beneficial as it provides quality protein and micronutrients to the people. However, from an environmental perspective, production, and consumption of ASF have substantial environmental and climate footprints that present challenges to sustainability (Poore & Nemecek 2018). According to the FAOSTAT data (2021), the livestock sector contributes around 70% of the agriculture-related CO_2 emissions in Ethiopia. The total emission attributable to the livestock sector in Ethiopia is projected to reach around 90% of the agricultural emission in 2030 (Bizikova, Brauw, Rose, Laborde, Motsumi, Murphy, Parent, Picard & Smaller 2022). The expansion of livestock to meet the rising demand for ASF must be done on the right scale and in accordance with the local ecosystem if the country is to achieve its economic and environmental goals simultaneously. In some cases, this may help to restore biodiversity and degraded land while also reducing greenhouse gas emissions from food production (Beal, Gardner, Herrero, Iannotti, Merbold, Nordhagen & Mottet 2023).

Contrary to the trend in western diets that are moving away from pulses, the consumption of pulses remained firm and relatively higher in Ethiopia. This trend has a significant beneficial effect in the transition toward more sustainable agriculture and sustainable food systems (Tidåker, Potter, Carlsson & Röös 2021). Pulses' ability to fix nitrogen promotes soil fertility, which raises and extends the productivity of farms. By lowering reliance on synthetic fertilisers used to add nitrogen to the soil artificially, pulses can also help to mitigate climate change. These fertilisers emit greenhouse gases, both during production and application, and the excessive usage of them could harm the ecosystem. As compared to ASF, pulses are lower carbon and water-footprint sources of protein (Foyer, Lam, Nguyen, Siddique, Varshney, Colmer, Cowling, Bramley, Mori, Hodgson, Cooper, Miller, Kunert, Vorster, Cullis, Ozga, Wahlqvist, Liang, Shou, Shi, Yu, Fodor, Kaiser, Wong, Valliyodan & Considine 2016). The prevailing consumption pattern in urban Ethiopia that promotes pulses as socially and culturally acceptable diets is beneficial not only from a dietary perspective, but also from a long-term health and productivity of farmland perspective, as well as protecting natural resources.

The past two decades have seen a substantial upsurge in the consumption of vegetables, which are rich sources of essential micronutrients, among the richer and the poorer households in urban Ethiopia. With an increasing awareness of the health and nutritional benefits of vegetables, the trends seem to suggest that consumption is bound to increase in the coming years. However, the current practices related to vegetable production, distribution, and consumption are challenged by an array of factors that make the vegetable food system unsustainable. Intensive applications of synthetic pesticides and fertilisers intended to maximise the yield and extend the shelf-life of vegetables cause food contamination and groundwater pollution, and also contribute to soil erosion (Juroszek, Lumpkin & Palada 2008; Mengistie, Mol & Oosterveer 2017). Despite these limitations, vegetable production is regarded as environmental and climate-friendly, as well as resource-saving, which may contribute to sustainability (Tilman & Clark 2014). Identifying and addressing sustainability issues in the vegetable sector is a prerequisite for the production and consumption of high-quality and safe products that contribute to a healthy diet (Hengsdijk, Sertse, Tesfaye & Likoko 2021).

In conclusion, a plant-based dietary intake prevailed in Ethiopia, which includes pulses, whole grains, vegetables, and fruits, might result in fewer greenhouse gas emissions, and probably decrease rates of diet-related noncommunicable illnesses. Increasing ASF consumption is required because existing consumption is quite low, but it is also critical to address sustainability problems in production and consumption. However, striking a balance between economic sustainability (productivity), social sustainability (preventing food insecurity, which may lead to conflict and political unrest), and environmental sustainability is critical.

7.5.6 Dietary transition in urban Ethiopia and food sovereignty

The dietary transition in Ethiopia, in addition to the detrimental implication on health and environmental sustainability, is also a cause for concern for food sovereignty. Food sovereignty entails the rights of people to nutritious and culturally acceptable food produced in environmentally sound and sustainable ways, as well as the right to establish their own food and agriculture system (Claeys 2013). Examining the dietary transition in urban Ethiopia through a food sovereignty lens helps to untangle how the concentration of power in the hands of corporates and its implications for the spread of obesity and NCDS in conjunction with the increasing dominance of unhealthy western diets (Sherwood, Arce, Berti & Bekkering 2013).

Ethiopia relies largely on the domestic production of food, such as cereals, pulses, livestock products, vegetables, and fruit. To obtain crucial foreign exchange, agricultural products such as coffee, pulses, fruit and vegetables, oilseeds, meat and meat products, and live animals are exported to the international market. Nevertheless, the demand for processed and input for processing foods is rising, which spurred the import of such products as palm oil, sugar and sweeteners, wheat, rice, prepared foods, distilled spirits, pasta, vegetable oil, intermediate products (e.g. malt, flour, yeast, hop extract), snack foods, condiments, and sauces (USDA 2017).

Imports of such food stuffs that constituted around 7% of the overall merchandise import in 2000 rose exponentially to a staggering 28% in 2021 (World Development Indicators 2022). The increase in the food import over time may reflect the continuous shift in preferences from domestic agricultural products to globalised products that undergo industrial processing. This means that Ethiopia exports fresh fruit and imports sugar-sweetened processed juices, exports tomatoes, but imports ketchup, started exporting wheat grain in 2023 but kept on importing processed wheat-based products (pasta, biscuits, noodles, and wheat flour). The diffusion of a western food culture (through the mainstream and internet media, the increased availability in the market) that favours processed foods instead of the traditional diets is more likely to be the reason behind the increased interest in unhealthy imported foods.

A case in point that demonstrates how people can lose their food sovereignty due to the supply chain from the international market is the Somalis of Eastern Ethiopia. The study has clearly demonstrated that the traditional Somali community food culture and food knowledge are increasingly being undermined by the increasing dominance of food supplied from the global markets controlled by the corporates. The food culture that relied on coarse grains, milk, meat, and ghee, are increasingly and rapidly being replaced with rice, sugar, wheat flour, pasta, and vegetable oil. The agricultural knowledge and skills that have been built up over generations are being lost because of the shift to a dependence on processed and mass-produced foods supplied from remote and unaccountable corporates. Exclusive reliance on food imports for their consumption makes consumers vulnerable to international price fluctuations. The local community is losing control over its own food system as the greatest power is concentrated in the hands of the corporates that control the supply chain. After the local food system was disrupted by climate change underpinned by socio-economic and political conditions, little has been done to rehabilitate the traditional food system. Because of the infestation of the market with processed foodstuffs supplied from the global market at relatively cheaper prices throughout the year, the indigenous small-scale sustainable production, distribution, and consumption system aligned with the culture of the people, is destined to vanish in most areas of the region. Such a profound change in the foodscape is likely to change the disease profile of the community in favour of NCDs.

Despite foreign direct investment to engage in retail businesses in Ethiopia is not granted to foreign companies, modern retail outlets of processed foods are rapidly expanding in Ethiopia. This has led to the encroachment of the indigenous food culture by western foods. For example, traditional bread is increasingly being replaced by white bakery bread prepared using imported and refined wheat and other baking inputs. The governmental intervention to mitigate the spiralling inflation in urban Ethiopia spurred the availability and accessibility of edible oils and processed wheat flour. Global corporates are suppliers of processed wheat and palm oil. As alternative healthy and traditional diets are becoming next to impossible to follow, people resort to the unhealthy options that are available everywhere and at cheaper prices. With extremely limited access to traditional foods in the presence of readily available fast food and white bread, instant noodles, and fast-food vendors, people are losing food sovereignty, that may put them at a greater risk of obesity and NCDs.

Another example of how people are losing food sovereignty is the rising displacement of traditional alcoholic and non-alcoholic beverages by industrial processed beverages, such as beer, soft drinks, and other alcoholic beverages. The beer and soft drink factories owned by corporations have the logistical capacity to supply their products throughout the country, target and advertise their products through different channels. The analysis in this study depicted that the real prices of homemade local beer (*tela*) have *increased*, which may be owing to the price increase of the ingredients needed to prepare it. This has given way to replacing the homemade local beer (*tela)* with factory-processed commercial beer that is widely available at relatively cheaper prices. As Lee, Regu and Seleshe (2015) indicated, if no effort is made to revive the local drinks by modernising the process, the age-old established *tela* technology will be extinct as the economy of the country improves.

On the other hand, the food sovereignty of the people is likely to be undermined due to the increasing dependence of the agriculture system on synthetic fertilisers and pesticides. As farmers' reliance on these agrochemicals for their agricultural production, they are moving away from the organic agriculture that has been in place for centuries including biological fertilisers and ecologically based pest control methods. This will undermine the control of people over their own food system in favour of the global corporates that produce and supply agrochemicals. The lack of sovereignty over fertiliser and pest control mechanisms contribute to the weakening of food sovereignty due to vulnerability to global economic shock in general and global fertiliser shock in particular.

7.5.7 Comparison of Popkin's nutrition transition and the observed pattern in urban Ethiopia (2000-2016), and prognosis

Over the past two decades, urban Ethiopia has seen a profound change in the dietary consumption pattern, nutrition, and disease profile. Because the nutrition transition is not occurring in a vacuum, it is critical to understand how the different cultural, social, religious, and demographic factors interact with economic drivers (income growth, urbanisation, labour force participation, technological change, amongst others) to shape people's dietary consumption pattern. In Table 7.1, the pattern suggested in Popkin's nutrition transition framework, the experience in urban Ethiopia based on the data analysed in this study, and prognosis of the trends in the upcoming one to two decades, are juxtaposed. The prognosis in the table was made based on understanding the evolving trends, the experiences of other countries, and certain assumptions related to changes in the socio-economic and demographic landscape.

TABLE 7.1: COMPARISON OF POPKIN'S NUTRITION TRANSITION FRAMEWORK AND THE OBSERVED PATTERN IN URBAN ETHIOPIA (2000-2016), AND PROGNOSIS

GLOBAL NUTRITION TRANSITION FRAMEWORK	OBSERVED PATTERN IN URBAN ETHIOPIA (2000-2016)	PROGNOSIS OF THE COURSE IN THE COMING 10 TO 20 YEARS
• Large overall dietary energy intake increases from energy-dense diets	• A massive increase in the average per capita dietary energy supply and consumption • The triple burden of malnutrition prevailed with a declining level of undernutrition and rising level of overnutrition over time.	• With nutrition transition progression underway, the average dietary intake is likely to increase.
• Starchy staples, (especially coarse cereals) and pulses become less important in the diet (Popkin, Adair & Ng 2012). • Large shift to refined carbohydrates increases (Popkin 2009)	• Despite the average calories derived from cereals, is increasing, their share out of total calorie consumption is plummeting due to the fast increment in the contribution from other food groups. • Teff continues to be the most important cereal in urban Ethiopia, albeit its share of dietary energy is steadily declining. • The consumption of coarse cereals, such as maize, sorghum, and barley exhibit a mixed trend, indicating that a significant dietary change is not taking place, in accordance with the basic tenets of nutrition transition. • The average intake and share of refined cereals, bakery bread, pasta, white rice,	• The consumption of teff will remain firm, whereas the share of coarse cereals is likely to fall steadily. • The contribution of refined cereals is likely to increase sharply. • The consumption of pulses is likely to remain stable. • Assumption: a continued increase in income.

GLOBAL NUTRITION TRANSITION FRAMEWORK	OBSERVED PATTERN IN URBAN ETHIOPIA (2000-2016)	PROGNOSIS OF THE COURSE IN THE COMING 10 TO 20 YEARS
	and factory-processed flour are increasing sharply. • The consumption of pulses remained constant. • The average quantities of roots, tubers and stems consumed increased progressively, although their share out of total calorie intake fell slowly.	

• Reductions in fibre and total vegetable intake	• The consumption of vegetables continues to rise, yet from a low baseline.
	• The consumption of fruit has stagnated at an exceptionally low level
		• The share of vegetables and fruit for both the rich and poor is likely to increase.
		• Assumptions:
		  • increased income, production, and availability
		  • improved knowledge and attitudes about the health benefits of F&V.

• Consumption of saturated fats	• The dietary energy derived from fats and oils keeps rising by displacing the share of starchy staples-owing to the increased availability and access to vegetable oil. • A modest increase in the consumption of animal-source fats, such as butter (extracted mainly from cow's milk).	• The share of fats and oil, particularly that of vegetable oil, is likely to grow vigorously, replacing the share of starchy staples. • Assumptions: an increased income.
• High intake of ASF, including processed meats and seafood increases (Popkin, Adair & Ng 2012).	• The quantities of ASF consumed continues to rise over time, while its share of dietary energy remained more or less stable.	• Prognosis: the role of ASF is likely to increase in the coming years from its present low level.

GLOBAL NUTRITION TRANSITION FRAMEWORK	OBSERVED PATTERN IN URBAN ETHIOPIA (2000-2016)	PROGNOSIS OF THE COURSE IN THE COMING 10 TO 20 YEARS
	• The meat consumption level is rising in urban Ethiopia, particularly in the form of the traditional Ethiopian dishes. • The consumption of ASF rises with an increase in the level of income.	• Assumption: An increased income.
• Consumption of non-essential foods and sugar-sweetened beverages grow rapidly. • Added caloric sweeteners (mainly sugar and high fructose corn syrup) increases. • As countries grow richer, higher volumes and a wider variety of UPFs are sold. (Baker et al, 2020)	• The slow but steady increase in the adaptation of "Western diets" prepared from processed meat, such as hamburgers, hot dogs, sausages, for example, is specifically concentrated around higher income groups and younger generation. • The consumption of UPF did not show a notable change between 2000 and 2016, contributing only 2 to 3% of the overall dietary energy consumption. • The consumption of soft drinks did not show a consistent trend, while its contribution to the overall dietary energy, remained insignificant. • The consumption of free sugar keeps rising, despite its contribution to the overall dietary energy, remained more or less stable at an acceptable level (around 4%, compared to the WHO's recommendation of less than 10%).	• The consumption of UPF is likely to grow, particularly among the high-income group. • Assumption: Supermarkets and convenience shops supplying UPFs continue to proliferate.
• Obesity prevalence has risen, resulting in Omran's last epidemiologic stage of degenerative disorders, attributable primarily to calorie-dense	• The prevalence of overweight and obesity keeps on rising (particularly among higher income groups and women)	• The prevalence of overweight and obesity is likely to continue rising further, especially among higher income groups. • Assumption: No profound behavioural

GLOBAL NUTRITION TRANSITION FRAMEWORK	OBSERVED PATTERN IN URBAN ETHIOPIA (2000-2016)	PROGNOSIS OF THE COURSE IN THE COMING 10 TO 20 YEARS
processed foods and sedentary lifestyle.		change takes place related to the consumption of energy-dense foods and a sedentary lifestyle.

7.6 CONCLUSIONS AND RECOMMENDATIONS

This study has demonstrated that urban Ethiopia has been undergoing a nuanced nutrition transition over the past two decades. The transition is underpinned by changes in factors related to the demographic transition (age, gender, household size, marital status, and level of educational attainment), economic transition (income, actual price, and affordability), epidemiologic transition (perceived causes and consequences of NCDs), food market (government subsidy, supply, for example), and agricultural transformation. Notwithstanding the traditional consumption habits based on whole grains, pulses, and vegetables continue to dominate in urban Ethiopia, the wheat and palm oil subsidy programme has increased the consumption of refined cereals and cheap edible oil, significantly changing the country's foodscape. The dietary energy derived from vegetable oils keeps rising by displacing the share of starchy staples. UPF is not yet a significant player in facilitating the nutrition transition in urban Ethiopia, but it is likely that it may emerge on a large scale, because its consumption mainly centres on the youth among the population.

The trend in the Somali region of Eastern Ethiopia is an indication of how the food system is controlled by neoliberalist corporations manipulating the market through the supply, price, promotion, and convenience could lead people to become hostage to them. People are abandoning the nutritious local foods and resorting to nutrient-poor foods dumped by the corporations that prioritise profit above the health and wellbeing of the consumers.

The increased reliance on imported vegetable oil, and the slow, but steady, increase in the UPF supply and consumption has the potential to destroy the food sovereignty of the people of the country in general, as it has been the case in many countries. The impending changes, particularly the demographic transition, the rise in income, the urbanisation, and the changes in food choices, are likely to affect the foodscape of the future urban Ethiopia significantly. This impending nutrition transition has ramifications for nutrition and food security, environmental, social, and economic sustainability, food sovereignty, and public health.

7.6.1 Recommendations for policy and practice

The dietary pattern in Ethiopia is presently at a crossroad, albeit with opportunities to avert the impending nutrition transition and the associated predicament. As the transition is currently at an early stage, designing and applying the appropriate policy and programme tools is likely to slow down or prevent the pace of the progression down the path. Obesity in urban Ethiopia is still low in comparison to developed and developing nations, but it is steadily growing, making it an emerging concern for the country. Delaying or reversing the detrimental course requires innovative and evidence-based comprehensive interventions addressing the problem. As a result, policy measures discouraging the obesogenic environment including the consumption of UPF may be more beneficial if implemented as soon as possible.

Food promotion should be rigorously regulated by prudent government rules and regulations, instead of leaving the door open for the aggressive marketing strategies of transnational corporations engaged in the food industry. This will help consumers to choose healthy foods by themselves without being misled by intensive commercial promotions. Advertising targeting children, in particular, should be regulated extensively since youngsters may not have the proper knowledge to understand and judge the veracity of food product marketing. It is critical to safeguard children from advertisements that encourage them to eat unhealthy foods and beverages.

Comprehensive policy measures should be designed and implemented to help liberate the food system from the grip of neoliberal corporations that prioritise profit above food and nutrition. Import dependency for some food products, compounded by low agricultural productivity, is a source of concern for food sovereignty, making people vulnerable to supply and price shocks, as illustrated by the situation following the outbreak of the Ukraine-Russia war. It is therefore critical to implement policies that encourage diverse nutrient-dense local food production and productivity by fostering smallholder farms and vegetable and fruit gardens that are supported by research, appropriate inputs, and technology. Educating farmers on how to reduce food waste, along with concerted support on how to promote efficient storage, distribution, processing, packaging, retail, and marketing systems is critical. Strengthening rural-urban linkages is essential for promoting locally produced, culturally acceptable, and healthy alternatives to the market-dumped, unsustainable, and unhealthy diets that transnational corporates are pushing.

Appropriate social and behavioural change communication strategies should be designed and put in place through mass media campaigns, social media activities, social marketing, and community events targeting people in different socio-economic and cultural groups and age and sex categories. The messages conveyed through these platforms should be designed to change people's behaviour to promote healthy dietary consumption and a healthy lifestyle. With the advent of overnutrition as an issue alongside undernutrition, the focus should be reoriented to cope with the double burden of malnutrition and, as a result, the concomitant double burden of diseases. Measures to combat undernutrition may exacerbate the obesity problem, whereas measures designed to fight obesity might starve the already energy-deficient poorest in the community. The nutrition impact of the wheat and oil subsidy programme of the Government of Ethiopia intended to abate the effect of inflation on poor households (and thus probably undernutrition has not been evaluated yet. This means that little is known about the extent to which this large-scale programme has affected the level and distribution of undernutrition and overnutrition in urban Ethiopia.

Economic tools, such as taxing unhealthy obesity causing UPF has been found to be effective in reducing obesity but at the same time spurred further malnutrition for those with fewer other options (Boysen, Boysen-Urban, Bradford & Balié 2019). Thus, it is imperative to design and implement evidence-based comprehensive policy instruments addressing the two problems simultaneously. Accordingly, it is highly recommended that the unhealthy UPF be taxed, and the proceeds used to promote healthy food consumption behaviours, such as: subsidising healthy foods, particularly targeting poor households, health education promoting healthy foods and a healthy lifestyle, for example. This should be aided by the establishment and revitalisation of efficient institutional arrangements in charge of these operations.

7.6.2 Recommendations for further research

Future studies should focus on understanding appropriate policy and programme instruments to promote healthy diets and sustainable food systems in Ethiopia. The research focus areas recommended in this regard include the following:

- Understanding the public health, socioeconomic, environmental, and sustainability implications of current food consumption trends and lifestyles.
- Identifying structural determinants and drivers of the consumption of UPF and obesity and overweight.
- Identifying effective social and behavioural change communication strategies to suppress the expanding obesogenic environment and promote healthy diet and lifestyle for various population segments (life-cycle approach, spatial, and socioeconomic and cultural groupings).

7.7 ASSESSING THE NUTRITION TRANSITION AS A THEORETICAL FRAMEWORK

Given the complexity of the matter, it is difficult to assert that the dietary change in urban Ethiopia fits the simplistic linear progression model perfectly proposed by Popkin (2006). Urban Ethiopia has an array of socio-economic and cultural contexts that distinguishes it from the Western world, and which may render the Popkin framework of limited contextual value. Despite evidence showing that diets in urban Ethiopia have adapted western consumption patterns, especially in terms of the consumption of sugary soft drinks, over-processed white bread, vegetable oil and some UPF, the nutrition transition in urban Ethiopia is progressing along its own trajectory. The differences between the global patterns of change and the progression in urban Ethiopia are depicted in Table 7.1.

In accordance with Popkin’s framework, urban Ethiopia's nutrition transition is underway, albeit the data suggest that it is still at the initial stages of the framework, with disparities between groups. The dietary transition of some of the affluent households tend to resemble stage three to stage four, which is characterised by consumption of more saturated fats and oils, ASF, refined carbohydrates, and UPF, resulting in a greater incidence of obesity and overweight. On the other hand, poorer households tend to lag behind, with predominantly starchy staples, pulses, vegetable oil, cheap processed foods in their diets and showing relatively low levels of overweight and obesity. There are also some segments of the population that show behavioural changes, similar to stage five of Popkin’s model, well ahead of the actualisation of stage four (degenerative diseases). The transition also has spatial dimensions, with varying levels of adapting to western diets, dietary preferences, purchasing power, accessibility to western foodstuffs, and adapting a sedentary lifestyle. The generational divide that gives rise to the younger generation's preference for UPF is a reason for concern since it signals future problems with obesity and NCD.

7.8 ASSESSING THE USE OF A MIXED METHODS RESEARCH DESIGN

This final section of the study attempts to assess the lessons learned from the experience of this study that employed mixed methods, which has its own peculiar features, and may provide insights into the evolving theoretical landscape of a mixed research method. This study used nationally representative repeated cross-sectional quantitative surveys conducted between 2000 and 2016 and qualitative data (using focus group discussions) collected in 2022 from three cities. The quantitative data analysis has informed the design of the qualitative study design and data collection tools target group. Given that nutrition transition is dynamic and evolves over time, an attempt was not made to limit the findings of the qualitative study to overlap with the study period of the quantitative study, that had ended some years back. The study applied an explanatory sequential research design of mixed research methods, in which the collection and analysis of quantitative data came before that of qualitative data. The quantitative data helped to depict the levels, trends, and drivers of the nutrition transition in urban Ethiopia, while the qualitative data provided a contextual understanding of the nutrition transition in urban Ethiopia. Given the greater difference between quantitative and qualitative data in terms of timing, spatial coverage, data nature (numbers and words), the study population, the sample sizes, amongst others, merging or embedding the two types of data at the analysis stage of the study would have resulted in a misleading conclusion. To overcome this mismatch stemming from these factors, the quantitative and qualitative data were analysed separately and then integrated at the synthesis stage of the study.

Another important lesson learnt is that using a mixed-methods research design provided a greater chance of understand the dynamics around the themes being investigated properly and answer the research questions. The use of pragmatism as the fundamental philosophical method, as opposed to post-positivism and interpretivism, helped to answer the research objectives accurately and in greater depth, which could not have been accomplished using either approach alone. The inferences of the study are mostly based on the numbers generated by the quantitative data, while the qualitative data offered context to support the validity of the conclusions obtained. The quantitative method helped assess patterns, trends, and drivers of change by employing a variety of statistical methods, such as econometric and spatial analysis, which could not be represented adequately using qualitative data alone. The qualitative data, on the other hand, provided the context in which complex socio-cultural and behavioural components of the transition, which could not be addressed using the quantitative data, were discussed.

REFERENCES

Abay, KA, Tiberti, L, Mezgebo, TG & Endale, M. 2020. Can urbanisation improve household welfare? Evidence from Ethiopia. *Journal of African Economies* 32(1): 81-109.

Abegaz GA, Hassen, IW & Minten, B. 2018. *Consumption of animal-source foods in Ethiopia: patterns, changes, and determinants.* Addis Ababa: IFPRI & the Ethiopian Development Research Institute.

Abrahams, Z, Mchiza, Z & Steyn, NP. 2011. Diet and mortality rates in Sub-Saharan Africa: stages in the nutrition transition. Available at: https://doi.org/10.1186/1471-2458-11-801 (Accessed on 03 March 2012).

Adams, J & White, M. 2015. Characterisation of UK diets according to degree of food processing and associations with socio-demographics and obesity: cross-sectional analysis of UK National Diet and Nutrition Survey (2008-12). *International Journal of Behavioural Nutrition and Physical Activity* 12(160): 17-23.

Addis Fortune Newspaper. 2019. *Palm oil in Ethiopia.* 14 September 2019.

Admassie, A. 2015. Food price policy in an era of market instability: a political economy analysis in Pinstrup-Andersen, P. (Ed.) *Food price policy in an era of market instability: a political economy analysis*. Oxford: Oxford University Press.

Aerni, P. 2011. Food sovereignty and its discontents. *African Technology Development Forum Journal* 8 (1/2): 23-40.

Afshin, A, Peñalvo, JL, Del Gobbo, L, Silva, J, Michaelson, M, O'Flaherty M, Capewell, S, Spiegelman, D, Danaei, G & Mozaffarian, D. 2017. The prospective impact of food pricing on improving dietary consumption: A systematic review and meta-analysis. Available at: https://doi.org/10.1371/journal.pone.0172277. (Accessed on 21 November 2020).

Ahmed, HA. 2007. *Structural analysis of price drivers in Ethiopia*. Addis Ababa: Ethiopian Development Research Institute.

Akerele, D & Odeiyi, K. 2015. Demand for diverse diets: evidence from Nigeria. Available at: DOI: 10.22004/ag.econ.204210. (Accessed on 21 November 2020).

Alem Y, & Söderbom, M. 2012. Household-level consumption in urban Ethiopia: the effects of a large food price shock. *World Development* 40(1): 146-162.

Amuna, P & Zotor, FB. 2008. Epidemiological and nutrition transition in developing countries: impact on human health and development. *The Proceedings of the Nutrition Society 67*(1): 82–90.

Anteneh, A, Araya, T & Misganaw, A. 2013. Factors associated with place of death in Addis Ababa, Ethiopia. *British Palliative Care* 12(14): 12-14.

Astrup, A & Brand-Miller, J. 2012. Diet composition and obesity. *The Lancet* 379:1100.

Atun, R, Davies, JI, Gale, EAM, Bärnighausen, T, Beran, D, Kengne, AP, Levitt, NS, Mangugu, FW, Nyirenda, MJ, Ogle, GD, Ramaiya, K, Sewankambo, NK, Sobngwi, E, Tesfaye, S, Yudkin, JS, Basu, S, Bommer, C, Heesemann, E, Manne-Goehler, J, Postolovska, I, Sagalova, V, Vollmer, S, Abbas, ZG, Ammon, B, Angamo, MT, Annamreddi, A, Awasthi, A, Besançon, S, Bhadriraju, S, Binagwaho, A, Burgess, PI, Burton, MJ, Chai, J, Chilunga, FP & Chipendo, P. 2017. Diabetes in sub-Saharan Africa: from clinical care to health policy. *The Lancet* 5(8): 622-667.

Aune, D, Giovannucci, E, Boffetta, P, Fadnes, LT, Keum, N, Norat, T, Greenwood, D C, Riboli, E, Vatten, LJ, & Tonstad, S. 2017. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality-a systematic review and dose-response meta-analysis of prospective studies. *International Journal of Epidemiology* 46(3): 1029–1056.

Avery, L, Rotondi, N, McKnight, C, Firestone, M, Smylie, J, & Rotondi, M. 2019. Unweighted regression models perform better than weighted regression techniques for respondent-driven sampling data: results from a simulation study. Available at: https://doi.org/10.1186/s12874-019-0842-5(Accessed on 21 November 2020).

Ayton, A & Ibrahim, A. 2019. Obesity is a public health emergency. *BMJ: British Medical Journal* 366.

Baba, M, Nagashima, H & Inasaka, H. 2009. Role of exercise in the prevention of obesity and hemodynamic abnormalities in adolescents. *Paediatrics International* 51: 359-363.

Baker, C. 2023. Obesity statistics. Available at: https://researchbriefings.files.parliament.uk/documents/SN03336/SN03336.pdf (Accessed on 17 June 2023).

Baker, P & Friel, S. 2014. Processed foods and the nutrition transition: evidence from Asia. *Obesity Reviews* 15(7): 564–577.

Baraldi, LG, Martinez Steele, E, Canella, DS & Monteiro, C A. 2018. Consumption of ultra-processed foods and associated sociodemographic factors in the USA between 2007 and 2012: evidence from a nationally representative cross-sectional study. Available at: https://doi.org/10.1136/bmjopen-2017-020574. (Accessed on 21 November 2020).

Barker DJ. 1995. Foetal origins of coronary heart disease. *British Medical Journal* 311(6998): 171–174.

Basu, S, McKee, M, Galea, G & Stuckler. D. 2013. Relationship of soft drink consumption to global overweight, obesity, and diabetes: a cross-national analysis of 75 countries. *American Journal of Public Health* 103: 2071–2077.

Bawah, A, Houle, B, Alam, N, Razzaque, A, Streatfield, PK, Debpuur, C, Welaga, P, Oduro, A, Hodgson, A, Tollman, S, Collinson, M, Kahn, K, Toan, TK, Phuc, HD, Chuc, NT, Sankoh, O & Clark, S J. 2016. The evolving demographic and health transition in four low- and middle-income countries: evidence from four sites in the INDEPTH Network of Longitudinal Health and Demographic Surveillance Systems. Available at: https://doi.org/10.1371/journal.pone.0157281(Accessed on 21 November 2020).

Beal, T, Gardner, CD, Herrero, M, Iannotti, LL, Merbold, L, Nordhagen, S, & Mottet, A. 2023. Friend or foe? The role of animal-source foods in healthy and environmentally sustainable diets. *The Journal of Nutrition* 153(2): 409–425.

Becker, GS. 1965. A theory of the allocation of time. *The Economic Journal* 75(299): 493–517.

Becquey, E, Savy, M, Danel, P, Dabiré, HB, Tapsoba, S & Martin-Prével, Y. 2010. Dietary patterns of adults living in Ouagadougou and their association with overweight. *Nutrition Journal* 9:13-21.

Bennett, MK. 1941. Wheat in national diets. *Wheat Studies* XVIII (2): 37–76.

Benoit, K. 2011. Linear regression models with logarithmic transformations. Available at: https://kenbenoit.net/assets/courses/ME104/logmodels2.pdf (Accessed on 30 June 2023).

Berhane, G, Paulos, Z & Tafere. K. 2011. *Food grain consumption and calorie intake patterns in Ethiopia*. ESSP II Working Paper 23. Addis Ababa: IFPRI/ESSP II.

Berti, PR. 2012. Intrahousehold distribution of food: a review of the literature and discussion of the implications for food fortification programs. *Food and Nutrition Bulletin* 33(3): S163–S169.

Birch, LL. 1999. Development of food preferences. *Annual Review of Nutrition* 19:41-62.

Bizikova, L, Brauw, AD, Rose ME, Laborde D, Motsumi, K, Murphy, M, Parent, M, Picard, F & Smaller, S. 2022. Achieving sustainable food systems in a global crisis: Ethiopia Ceres 2030 deep dives into the nexus of food systems, climate change, and diets. Available at: https://www.iisd.org/publications/report/sustainable-food-systems-global-crisis-summary (Accessed on 30 June 2023).

Black, RE, Victora, CG, Walker, SP, Bhutta, ZA & Christian, P. 2013. Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet* 382(9890): 427–451.

Bleich, S, Cutler D, Murray, C & Adams, A. 2008. Why is the developed world obese? *Annual Review of Public Health* 29:273–295.

Bloom, DE & Canning, D. 2011. Demographics and development policy. *Development Outreach:* 77-81.

Bloom, DE, Canning, D & Sevilla, J .2003. *The demographic dividend: a new perspective on the economic consequences of population change.* Santa Monica, CA: RAND.

Blouin, C, Chopra, M & van der Hoeven, R. 2009. Trade and social determinants of health. *Lancet* 373(9662): 502–507.

Bongaarts, J & Casterline, J. 2013. Fertility transition: is sub-Saharan Africa different? *Population and Development Review* 38(Suppl 1): 153-168.

Bonke, J.1992. *Choice of foods: allocation of time and money, household production and market services.* Copenhagen: MAPP.

Bosu, WK. 2014. An overview of the nutrition transition in West Africa: implications for non-communicable diseases. *Proceedings of the Nutrition Society* 74(4): 466–477.

Boysen, O, Boysen-Urban, K, Bradford, H & Balié, J. 2019. Taxing highly processed foods: What could be the impacts on obesity and underweight in sub-Saharan Africa? *World Development* 119: 55–67.

Brabin, BJ, Coulter, JBS, Cook, GC & Zumla, AI. 2003. Nutrition-associated disease. In: Cook GC & Zumla AI (Eds.), *Manson's tropical diseases. London:* Saunders.

Breewood, H. 2018. What is the nutrition transition? Available at: https://www.foodsource.org.uk/building-blocks/what-nutrition-transition. (Accessed on 24 June 2019).

Bruin, S & Dengerink, J. 2020. *The impact of urbanisation on food systems in West and East Africa: opportunities to improve rural livelihoods*. The Hague: PBL Netherlands Environmental Assessment Agency.

Caballero, BA. 2005. Nutrition paradox: underweight and obesity in developing countries. *New England Journal of Medicine* 352(15): 1514-1556.

Caldwell, JC, Caldwell, BK, Caldwell, P, McDonald, PF & Schindlmayr, T. 2006. *Demographic transition theory.* Dordrecht: Springer.

Calle, EE, Thun, MJ, Petrelli, JM, Rodriguez, C & Heath, CW. 1999. Body-mass index and mortality in a prospective cohort of U.S. adults. *New England Journal of Medicine* 341(15):1097–1105.

Cameron, AC & Trivedi, PK. 2005. *Micro-econometrics methods and applications*. Cambridge: Cambridge University Press.

Canella, DS, Levy, RB, Martins, APB, Claro, R, Moubarac, JC, Baraldi, L, Cannon, G & Monteiro, CA. 2014. Ultra-processed food products and obesity in Brazilian households (2008–2009). *PLoS ONE* 9: e92752.

Caussy, C, Pattou, F, Wallet, F, Simon, C, Chalopin, S, Telliam, C, Mathieu, D, Subtil, F, Frobert, E, Alligier, M, Delaunay, D, Vanhems, P, Laville, M, Jourdain, M & Disse, E. 2020. Prevalence of obesity among adult inpatients with COVID-19 in France. *Lancet Diabetes Endocrinology* 8(7): 562-564.

Cediel, G, Reyes, M, Da Costa Louzada, M, Martinez Steele, E, Monteiro, C, Corvalán, C & Uauy, R. 2018. Ultra-processed foods and added sugars in the Chilean diet (2010). *Public Health Nutrition* 21(1): 125-133.

Center for Epidemiological Research in Nutrition and Health. 2018. Food, nutrition & fitness i: the digestion journey begins with food choices. Available at: https://educhange.com/wp-content/uploads/2018/09/NOVA-Classification-Reference-Sheet.pdf (Accessed on 23 January 2023).

Central Statistical Agency (CSA) & ICF International. 2017. *Ethiopian demographic and health survey 2016*. Addis Ababa, Ethiopia and Rockville, Maryland: CSA &ICF.

Central Statistical Agency (CSA) & ORC Macro. 2006. *Ethiopia Demographic and Health Survey 2005.* Addis Ababa, Ethiopia: Central Statistical Agency/Ethiopia and ORC Macro.

Central Statistical Agency. (CSA). 2010. *2007 Population and Housing Census of Ethiopia*. Available at: https://www.statsethiopia.gov.et/wp-content/uploads/2019/06/National_Statistical.pdf) (Accessed on 12 December 2020).

Central Statistical Agency. (CSA). 2013. *Population projection of Ethiopia for all regions at woredas level from 2014 –2017.* Addis Ababa: CSA.

Central Statistical Agency. (CSA). 2016. 2015/16 *Agricultural sample survey, crop, and livestock product utilization survey*. Addis Ababa: CSA.

Central Statistical Agency. (CSA). 2017. *Agricultural sample survey 2015/16*. Addis Ababa: CSA.

Central Statistical Agency. (CSA). 2018. *The 2015/16 Ethiopian household consumption expenditure (HCE) survey: results for country level statistical report.* Addis Ababa: CSA.

Cheah, YK, Applanaidu, SD, Abdul Adzis, A & Abu Bakar, J. 2021. Sociodemographic and lifestyle determinants of household consumption of sugar-sweetened food in Malaysia: a short communication. *Journal of Economics and Sustainability* 2(1): 62–73.

Chen, BK, Seligman, B, Farquhar, JW & Goldhaber-Fiebert, JD. 2011. Multi-country analysis of palm oil consumption and cardiovascular disease mortality for countries at different stages of economic development: 1980–1997. *Global Health* 12(16): 13-45.

Chetty, P & Jain, R. 2017. *How to conduct generalized least squares test?* Available at: https://www.projectguru.in/conduct-generalized-least-squares-test/ (Accessed on 01 October 2022).

Chiappori, PA & Donni, O. 2009. *Non-unitary models of household behavior: a survey of the literature.* Munich: IZA.

Cincotta, R, Engelman, R & Anastasion, D. 2003. *The security demographic: population and civil conflict after the cold war*. Available at: https://www.wilsoncenter.org/event/the-security-demographic-population-and-civil-conflict-after-the-cold-war#:~:text=The%20Security%20Demographic%20examines%20the,rates%20of%20growth%2C%20age%20structure. (Accessed on 01 October 2022).

Claeys, P. 2013. *Food sovereignty: a critical dialogue.* Available at: https://www.tni.org/files/download/24_claeys_2013-1.pdf. (Accessed on 01 October 2022).

Coates, J, Patenaude, BN, Rogers, BL, Roba, AC, Woldetensay, YK, Tilahun, AF & Spielman, KL. 2018. Intra-household nutrient inequity in rural Ethiopia. *Food Policy* 81: 82-94.

Cochrane, L & Bekele, YW. 2018. Contextualizing narratives of economic growth and navigating problematic data: economic trends in Ethiopia (1999–2017). *Economies* 6(4): 64-75.

Colchero, MA, Rivera-Dommarco, J, Popkin, BM & Ng, S. W. 2017. In Mexico, evidence of sustained consumer response two years after implementing a sugar-sweetened beverage tax. *Health Affairs 36*(3): 564–571.

Compact 2025. 2018. Compact 2025: Accelerating the end of hunger and undernutrition. Available at: http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/132919 (Accessed on 3 July 2019).

Corsi DJ, Neuman M, Finlay JE, Subramanian SV. 2012. Demographic and health surveys: a profile. *International Journal of Epidemiology* 41(6):1602-1613.

Cross, AJ, Leitzmann, MF, Gail, MH, Hollenbeck, AR, Schatzkin, A, & Sinha, R. 2007. A prospective study of red and processed meat intake in relation to cancer risk. *PLoS Medicine* 4(12): e32-35.

Da Silva, KE, Tanmoy, AM, Pragasam, AK, Iqbal, J, Sajib, MSI, Mutreja, A, Veeraraghavan, B, Tamrakar, D, Qamar, FN, Dougan, G & Bogoch, I. 2022. The international and intercontinental spread and expansion of antimicrobial-resistant Salmonella Typhi: a genomic epidemiology study. *The Lancet Microbe* 3(8): e567-e577.

Darmon, N & Drewnowski, A. 2015. Contribution of food prices and diet cost to socioeconomic disparities in diet quality and health: a systematic review and analysis. *Nutrition Reviews* 73(10): 643–660.

Davidson, RC, Davidson, ER, MacKinnon JG & MacKinnon. EJG. 2004. *Econometric theory and methods*. Oxford: Oxford University Press.

Dawadi, S, Shrestha, S & Giri, RA. 2021. Mixed-methods research: a discussion on its types, challenges, and criticisms. *Journal of Practical Studies in Education* 2(2): 25-36.

De Soysa, I & De Soysa, AK. 2018. Do globalization and free markets drive obesity among children and youth? An empirical analysis 1990–2013. *International Interactions* 44(1): 88–106.

Defo, BK. 2014. Demographic, epidemiological, and health transitions: are they relevant to population health patterns in Africa? *Global Health Action* 7(2): 24-43.

Delgado, CL. 2003 Rising consumption of meat and milk in developing countries has created a new food revolution. *Journal of Nutrition* 133: 3907S-3910S.

DeMaio, A. 2019. Addressing the double burden of malnutrition as both crisis and opportunity, in Double *burden of malnutrition,* edited by B Gavin-Smith & K Gabrielle van Zutphen, Burger Druck, Waldkirch, Germany

Dercon, S & Krishnan, P. 2000. Vulnerability, seasonality, and poverty in Ethiopia*. Journal of Development Studies* 36: 25–53.

Development Initiatives. 2018. *2018 Global nutrition report: Shining a light to spur action on nutrition.* Bristol: Development Initiatives.

Dicken, SJ & Batterham, RL. 2021. The role of diet quality in mediating the association between ultra-processed food intake, obesity, and health-related outcomes: a review of prospective cohort studies. *Nutrients* 14(1): 23-38.

Diewert, WE. 2008. Index numbers, in *The new Palgrave dictionary of economics*, edited by SN Dauerlauf & LE Blume. London: Palgrave Macmillan.

Donni, O & Ponthieux, S. 2011. Economic approaches to household behavior: from the unitary model to collective decisions. *Travail, genre et sociétés* 26(2): 67-83.

Drewnowski A. 1997. Taste preferences and food intake. *Annual Review of Nutrition 17:* 237–253.

Drewnowski, A & Popkin, BM. 1997. The nutrition transition: new trends in the global diet. *Nutrition Reviews* 55(2): 31–43.

Duffey, KJ, Gordon-Larsen, P, Shikany, JM, Guilkey, D, Jacobs, DR & Popkin, BM. 2010. Food price and diet and health outcomes: 20 years of the CARDIA study. *Archives of Internal Medicine* 170(5): 420–426.

Ecker, O & Fang, P. 2016. Economic development and nutrition transition in Ghana: Taking stock of food consumption patterns and trends. In *Achieving a nutrition revolution for Africa: The road to healthier diets and optimal nutrition,* edited by C, Namukolo & SL Hendriks. Washington, D.C.: IFPRI.

Edelman, M. 2013. Food sovereignty: forgotten genealogies and future regulatory challenges. *The Journal of Peasant Studies* 41(6): 959-978.

Ervin, D, López-Carr, D & López-Carr, A. 2013. The nutrition transitions. Available at: https://www.oxfordbibliographies.com/view/document/obo-9780199874002/obo-9780199874002-0078.xml (Accessed on 24 May 2019).

Ethiopian Food, Medicines and Health Care Administration and Control Authority. (EFMHACA). 2017. Food advertisement control directive 33/2008. Available at: http://www.fmhaca.gov.et/publication/food-advertising-directive/(Accessed on 12 December 2020).

Ethiopian Law. 2019. Available at: https://ethiopianlaw.com/sectors-of-investment-open-for-foreign-investors-in-ethiopia/ (Accessed on 3 January 2021).

Fairlie, RW. 2005. An extension of the Blinder–Oaxaca decomposition technique to logit and probit models. *Journal of Economic and Social Measurement* 30: 305–316.

Fanzo, J. 2012. *The nutrition challenge in Sub-Saharan Africa*. Washington: UNDP.

Farvid, MS, Sidahmed, E, Spence, ND, Mante Angua, K, Rosner, BA & Barnett, J B. 2021. Consumption of red meat and processed meat and cancer incidence: a systematic review and meta-analysis of prospective studies. *European Journal of Epidemiology* 36(9): 937–951.

Federal Democratic Republic of Ethiopia Planning and Development Commission. 2018. *Poverty and economic growth in Ethiopia (1995/96-2015/16).* Addis Ababa: DFREPDC.

Federal Ministry of Health. 2008. *National nutrition strategy.* Addis Ababa: Moh.

Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia. 2019. Food and Medicine Administration Proclamation (Proclamation No.1112/2019) Available at: http://www.fmhaca.gov.et/publication/food-and-medicine-administration-proclamation-no-1112-2019/ (Accessed on 12 December 2020).

Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia. 2020a. The Excise Tax Proclamation (Proclamation No. 1186/2020). Available at https://www.lawethiopia.com/images/EXCISE%20TAX%20PROCLAMATION.pdf (Accessed on 12 February 2021).

Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia. 2020b. Investment Regulation No. 474/2020. Available at http://admin.theiguides.org/Media/Documents/Investment-Regulation-No.-4742020_09-08-2020_0001-2.pdf (Accessed on 12 February 2021).

Feilzer, MY. 2010. Doing mixed methods research pragmatically: implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research* 4(1): 6–16.

Fetters, MD. 2016. Haven't we always been doing mixed methods research? Lessons learned from the development of the horseless carriage. *Journal of Mixed Methods Research* 10(1): 3–11.

Fiedler, JL & Mwangi, DM. 2016. *Using household consumption and expenditure surveys to make inferences about food consumption, nutrient intakes, and nutrition status. How important is it to adjust for meal partakers?* Washington: IFPRI.

Food and Agriculture Organization. (FAO). n.d. Key differences between new and old Food Balance Sheet (FBS) methodology. Available at: http://fenixservices.fao.org/faostat/static/documents/FBS/Key%20differences%20 between%20new%20and%20old%20Food%20Balance%20Sheet.pdf. (Accessed on 12 December 2020).

Food and Agriculture Organization. (FAO). 2001. *Food balance sheets: A handbook*. Rome: FAO.

Food and Agriculture Organization. (FAO). 2008. *Food balance sheet: A handbook*. Rome: FAO.

Food and Agriculture Organization. (FAO). 2010. *Fats and fatty acids in human nutrition. Report of an expert consultation.* Rome: FAO.

Food and Agriculture Organization. (FAO). 2016. *Influencing food environments for healthy diets.* Rome: FAO.

Food and Agriculture Organization. (FAO). 2018. Sustainable food systems: Concept and framework. Available at: http://www.fao.org/3/ca2079en/CA2079EN.pdf (Accessed on 14 June 2019).

Food and Agriculture Organization. (FAO). 2019. *FAOSTAT statistical database.* Available at: http://www.fao.org/faostat/en/#data/FBS (Accessed on 3 December 2020).

Food and Agriculture Organization. (FAO). 2020. FAOSTAT statistical database. Available at: http://www.fao.org/faostat/en/#data/FBS (Accessed on 3 February 2023).

Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Program (WFP) & World Health Organization (WHO). 2022. *The state of food security and nutrition in the world 2022. Repurposing food and agricultural policies to make healthy diets more affordable.* Rome: FAO.

Food and Agriculture Organization (FAO) & the World Bank. 2018. *Food data collection in household consumption and expenditure surveys. Guidelines for low- and middle-income countries*. Rome: FAO.

Food and Nutrition Board. 1989. *Recommended dietary allowances.* 10th Ed. Washington DC: National Research Council.

Forouzanfar, MH, Alexander, L, Anderson, HR, Bachman, VF & Biryukov, S. 2015. Global, regional, and national comparative risk assessment of 79 behavioural, environmental, and occupational, and metabolic risks or clusters of risks in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet* 386 (10010): 2287-2323.

Forshee, RA, Anderson PA, & Storey ML. 2008. Sugar-sweetened beverages and body mass index in children and adolescents: a meta-analysis. *American Journal of Clinical Nutrition* 2008(87):1662-1671.

Foyer, CH, Lam, HM, Nguyen, HT, Siddique, KH, Varshney, RK, Colmer, TD, Cowling, W, Bramley, H, Mori, TA, Hodgson, JM, Cooper, JW, Miller, AJ, Kunert, K, Vorster, J, Cullis, C, Ozga, JA, Wahlqvist, ML, Liang,Y, Shou, H, Shi, K, Yu, J, Fodor, N, Kaiser, BN, Wong, FL, Valliyodan, B & Considine, MJ. 2016. Neglecting legumes has compromised human health and sustainable food production. *Nature Plants* 2(2) 22-45.

Friel, S, Chopra, M & Satcher, D. 2007. Unequal weight: equity-oriented responses to the global obesity epidemic. *British Medical Journal* 335: 12-41.

Fung, W. 2010. Early childhood malnutrition and adult obesity: evidence from the 1959-61 China famine. Available at: https://www.researchgate.net/publication/228650594_Early_Childhood_Malnutrition_and_Adult_Obesity_Evidence_from_the_1959-61_China_Famine (Accessed on 14 June 2019).

Gao, F, Zheng, KI, Wang, XB, Sun, QF, Pan, KH, Wang, TY, Chen, Y P, Targher, G, Byrne, CD, George, J & Zheng, MH. 2020. Obesity is a risk factor for greater COVID-19 severity. *Diabetes Care* 43(7): e72–e74.

Gartaula, H, Patel, K, Derek, J & Moghariya, D. 2013. Food sovereignty: a critical dialogue: Available at: https://www.iss.nl/sites/corporate/files/74_gartaula_et_al_2013.pdf. (Accessed on 14 June 2020).

Gebru, M, Remans, R, Brouwer, I, Baye, K, Melesse, MB, Covic, N, Habtamu, F, Abay, AH, Hailu, T, Hirvonen, K, Kassaye, T, Kennedy, G, Lachat, C, Lemma, F, McDermott, J, Minten, B, Moges, T. Reta, F, Tadesse, E, Taye, T, Truebswasser, U & Vandenberg, M. 2018. Food systems for healthier diets in Ethiopia: Toward a research agenda. Washington, DC: International Food Policy Research Institute (IFPRI).

Ghiara, V. 2020. Disambiguating the role of paradigms in mixed methods research. *Journal of Mixed Methods Research* 14(1): 11–25.

Gillespie, S & Haddad, L. 2001. *Attacking the double burden of malnutrition in Asia and the Pacific.* Washington: IFPRI.

Giuli, C, Papa, R, Mocchegiani, E & Marcellini, F. 2012. Dietary habits and ageing in a sample of Italian older people. *The Journal of Nutrition, Health & Aging* 16(10): 875–879.

Global Hunger Index. nd. Available at: https://www.globalhungerindex.org/ranking.html (Accessed on 1 July 2022).

Godfray, HJ, Aveyard, P, Garnett, T, Hall, JW, Key, TJ, Lorimer, J, Pierrehumbert, RT, Scarborough, P, Springmann, M & Jebb, SA. 2018. Meat consumption, health, and the environment. Available at: https://doi.org/10.1126/science.aam5324 (Accessed on 1 July 2022).

Government of Federal Democratic Republic of Ethiopia (FDRE). 2013. *National nutrition programme (2013-2015).* Addis Ababa: Government of Ethiopia.

Grace D. 2015. Food safety in low- and middle-income countries. *International Journal of Environmental Research and Public Health* 12(9): 10490–10507.

Greene, WH. 2011. *Econometric analysis.* London: Prentice Hall.

Grobler, CJW, 2015. *Socio-economic determinants of household dietary diversity in a low-income neighbourhood in South Africa*. Dubai: International Business Research.

Haddad, LJ, Peña, C, Nishida, C, Quisumbing, AR & Slack, AT.1996. *Food security and nutrition implications of intrahousehold bias*. Washington: IFPRI.

Hales, CN & Barker, DJ. 2001. The thrifty phenotype hypothesis. *British Medical Bulletin* 60: 5–20.

Han, TSA & Lean, MEJ. 2016. A clinical perspective of obesity, metabolic syndrome, and cardiovascular disease. *Journal of the Royal Society of Medicine Cardiovascular Disease* 5: 1–13.

Hassen Worku, I, Dereje, M, Minten, B & Hirvonen, K. 2017. Diet transformation in Africa: the case of Ethiopia. *Agricultural Economics* 48: 73–86.

Hawkes, C, Chopra, M, Friel, S, Lang, T & Thow, AM. 2007. *Globalization, food, and nutrition transitions.* University of Ottawa: Institute of Population Health, Globalization and Health Equity

Hawkes, C, Harris, J & Gillespie, S. 2017. Changing diets: Urbanisation and the nutrition transition, in *2017 Global Food Policy Report,* edited by IFPRI. Washington: IFPRI.

Hawkes, C, Smith, TG, Jewell, J, Wardle, RA, Hammond, S, Friel, AM & Kain, J. 2015. Smart food policies for obesity prevention. *Lancet* 385(9985): 2410–2421.

Hawkes, C. 2003. Marketing activities of global soft drink and fast-food companies in emerging markets: A review. Available at: https://apps.who.int/iris/handle/10665/42609(Accessed on 29 June 2020).

Hawkes, C. 2006. Uneven dietary development: Linking the policies and processes of globalization with the nutrition transition, obesity, and diet-related chronic diseases. *Globalization and Health* 2(4): 2-4.

Headey, DD; Hoddinott, JF & Park, S. 2016. Drivers of nutritional change in four South Asian countries: A dynamic observational analysis. *Maternal & Child Nutrition* 12 (Supplement 1): 210–218.

Hengsdijk, H, Sertse, Y, Tesfaye, S, Likoko, E. 2021. *Fruits and vegetable scoping study: Ethiopia; An assessment of current constraints and opportunities for development.* Wageningen: Wageningen Economic Research.

Herforth, A & Ahmed, S. 2015. The food environment, its effects on dietary consumption, and potential for measurement within agriculture-nutrition interventions. *Food Security 7*: 505–520.

High Level Panel of Experts on Food Security and Nutrition. (HLPE). 2017. *Nutrition and food systems*. Rome: HLPE.

Huffman, SL, Piwoz, EG, Vosti, SA & Dewey, KG .2014. Babies, soft drinks, and snacks: a concern in low- and middle-income countries? *Maternal and Child Nutrition* 10(4): 562–574.

International Food Policy Research Institute. 2010. Pulses value chain in Ethiopia: Constraints and opportunities for exchanging exports. Available at: http://www.fao.org/3/a-at305e.pdf (Accessed on 12 January 2021).

International Monetary Fund. (IMF). 2008. *Federal Democratic Republic of Ethiopia: selected issues*. Washington, DC: IMF.

Jann, B. 2008. The Blinder–Oaxaca decomposition for linear regression models. *The Stata Journal 8*(4): 453 479.

Jardim, MZ, Costa, BVL, Pessoa, MC & Duarte, CK. 2021. Ultra-processed foods increase noncommunicable chronic disease risk. *Nutrition Research* 95: 19–34.

Jariseta, ZR, Dary, O, Fiedler, JL & Franklin, N. 2012. Comparison of estimates of the nutrient density of the diet of women and children in Uganda by Household Consumption and Expenditures Surveys (HCES) and 24-hour recall*. Food and Nutrition Bulletin* 33(3): S199–S207.

Jones, JM, Peña, RJ, Korczak, R & Braun, H J. 2015. Carbohydrates, grains, and wheat in nutrition and health: An overview part I. Role of carbohydrates in health. *Cereal Foods World* 60(5): 224-233.

Juroszek, P, Lumpkin, T & Palada, M. 2008. Sustainable vegetable production systems. *Acta Horticulturae* 767:133-150.

Kadandale, S, Marten, R & Smith, R. 2019. The palm oil industry and noncommunicable diseases. *Bulletin of the World Health Organization* 97:118-128.

Kahn, K, Garenne, ML, Collinson, MA & Tollman, SM. 2007. Mortality trends in a new South Africa: hard to make a fresh start. *Scandinavian Journal of Public Health Supplements* 35(69 Suppl): 26-32.

Kalligeros, M, Shehadeh, F, Mylona, EK, Benitez, G, Beckwith, CG, Chan, PA & Mylonakis, E. 2019. Association of obesity with disease severity among patients with coronavirus disease obesity. *Obesity* 28(7):1200-1204.

Kapoor, N, Arora, S & Kalra, S. 2021. Gender disparities in people living with obesity - an unchartered territory. *Journal of Mid-Life Health* 12(2): 103–107.

Katzmarzyk, PT, Salbaum, JM & Heymsfield, SB. 2020. Obesity, noncommunicable diseases, and COVID-19: A perfect storm. *American Journal of Human Biology* 32(5): e234-284.

Kaur, KD, Jha, A, Sabikhi, L & Singh, AK. 2014. Significance of coarse cereals in health and nutrition: a review. *Journal of Food Science and Technology* 51(8): 1429–1441.

Kaya, IH. 2016. Motivation factors of consumers' food choice. *Food and Nutrition Sciences* 7(3): 149-154.

Kearney J. 2010. Food consumption trends and drivers. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, *365*(1554), 2793–2807. https://doi.org/10.1098/rstb.2010.0149

Kebede, Y, Andargie, G, Gebeyehu, A, Awoke, T, Yitayal, M, Mekonnen, S, Wubshet, M, Azmeraw, T, Lakew, Y & Alemu, K. 2017. Tuberculosis and HIV are the leading causes of adult death in northwest Ethiopia: evidence from verbal autopsy data of Dabat health and demographic surveillance system, 2007-2013. *Population Health Metrics* 15(1): 27-39.

Kelles, A & Adair, L. 2009. Offspring consume a more obesogenic diet than mothers in response to changing socioeconomic status and urbanisation in Cebu, Philippines. *International Journal of Behavioral Nutrition and Physical Activity* 6(1): 1–11.

Kennedy, EM, Tessema, T, Hailu, D, Zerfu, A, Belay, G, Ayana, D, Kuche, T, Moges, T, Assefa, A, Samuel, T, Kassaye, H, Fekadu & van Wassenhove, J. 2015. Multisector nutrition program governance and implementation in Ethiopia: Opportunities and challenges. *Food and Nutrition Policy* 36(4): S34–S48.

Khandker, S. 2012. Seasonality of income and poverty in Bangladesh. *Journal of Development Economics* 97: 244-256.

Khandpur, N, Cediel, G, Obando, DA, Jaime, PC & Parra, DC. 2020. Sociodemographic factors associated with the consumption of ultra-processed foods in Colombia. Available at: https://doi.org/10.11606/s1518-8787.2020054001176. (Accessed on 1 July 2022).

Kirk, D. 1996. Demographic transition theory. *Population Studies* 50(3):361-387.

Klang, E, Kassim, G, Soffer, S, Freeman, R, Levin, MA & Reich, DL. 2020.Severe obesity as an independent risk factor for COVID-19 mortality in hospitalized patients younger than 50. *Obesity* 28(9):1595-1599.

König, LM, Sproesser, G, Schupp, HT & Renner, B. 2021.Preference for intuition and deliberation in eating decision-making: Scale validation and associations with eating behaviour and health. *British Journal of Health Psychology* 26(1):109–131.

Kroshus, E. 2008. Gender, marital status, and commercially prepared food expenditure. *Journal of Nutrition Education and Behavior* 40(6):355-360.

Kuznets, S. 1955. Economic growth and income inequality. *The American Economic Review* 45: 1-28.

Lane, MM, Davis, JA, Beattie, S, Gómez-Donoso, C, Loughman, A, O'Neil, A, Jacka, F, Berk, M, Page, R, Marx, W & Rocks, T. 2021. Ultra processed food and chronic noncommunicable diseases: A systematic review and meta-analysis of 43 observational studies. *Obesity Reviews* 22(3):131-146.

Lang, T & Rayner, G. 2007. Overcoming policy cacophony on obesity: An ecological public health framework for policymakers. *Obesity Reviews* 8 (Suppl 1):165-1681.

Laskowski, W, Górska-Warsewicz, H, Rejman, K, Czeczotko, M & Zwolińska, J. 2019. How important are cereals and cereal products in the average Polish diet? *Nutrients* 11(3): 679-693.

Lee, A, Mhurchu, CN, Sacks, G, Swinburn, B, Snowdon, W, Vandevijvere, S, Hawkes, C, L'abbé, M, Rayner, M, Sanders, D, Barquera, S, Friel, S, Kelly, B, Kumanyika, S, Lobstein, T, Ma, J, MacMullan, J, Mohan, S, Monteiro, C & Neal, B. 2013. Monitoring the price and affordability of foods and diets globally. *Obesity Reviews* 14(Supplement 1): 82–95.

Lee, M, Regu M & Seleshe, S. 2015. Uniqueness of Ethiopian traditional alcoholic beverage of plant origin, tella. *Journal of Ethnic Foods* 2(3): 110-114.

Leung, L. 2015. Validity, reliability, and generalizability in qualitative research. *Journal of Family Medicine and Primary Care* 4(3): 324–327.

Li, M, Gong, W, Wang, S & Li, Z. 2022. Trends in body mass index, overweight and obesity among adults in the USA, the NHANES from 2003 to 2018: a repeat cross-sectional survey. *BMJ Open*16(12): 65-90.

Liberto, D. 2023. Consumer theory: definition, meaning, objective, and example. Available at: https://www.investopedia.com/terms/c/consumer-theory.asp (Accessed on 8 July 2023).

Lima, JP, Costa, SA, Brandão, TR & Rocha, A. 2021. Food consumption determinants and barriers for healthy eating at the workplace—a university setting. *Foods* 10(4): 695-709.

Lippi, G, Mattiuzzi, C & Cervellin, G. 2016. Meat consumption and cancer risk: a critical review of published meta-analyses. *Critical Reviews in Oncology/Haematology* 97*:* 1–14.

Lividini K, Fiedler, JL & Bermudez, OI. 2013. Policy implications of using a household consumption and expenditures survey versus an observed-weighed food record survey to design a food fortification program. *Food and Nutrition Bulletin* 34(4):520-532.

Lobstein, T. 2014.*Reducing consumption of sugar-sweetened beverages to reduce the risk of childhood overweight and obesity*. Geneva: World Health Organisation.

Loening, JD, Durevall, D & Birru, Y. 2008. *Inflation dynamics and food prices in an agricultural economic: the case of Ethiopia.* Washington, DC: World Bank.

Lopes da Rocha, K, Silvério, RNC, Fortins, RF, Santos, MSD, Carmo, CND, da Costa, V M, Luescher, JL & de Carvalho Padilha, P. 2021. Determinants of ultra-processed food consumption in Brazilian children and adolescents with type 1 diabetes mellitus: a cross-sectional study. *Journal of Paediatric Endocrinology & Metabolism* 34(11), 1449–1456.

Madsen, EM, Daumerie, B & Hardee, K. 2010. The effects of age structure on development policy issue brief. Available at: https://pai.org/wp-content/uploads/2012/01/SOTC_PIB.pdf. (Accessed on 10 December 2020).

Maletta, HE.2014. What we eat: Changing patterns of food consumption around the world. Available at: https://ssrn.com/abstract=2503547_(Accessed on 1 July 2022).

Malik, VS, Pan, A, Willett, WC & Hu, FB. 2013. Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *American Journal of Clinical Nutrition* 98(4):1084–1102.

Mancino, L & Kinsey, J. 2008. Is dietary knowledge enough? Hunger, stress, and other roadblocks to healthy eating*.* Available at:

https://www.ers.usda.gov/webdocs/publications/46048/12039_err62_1_.pdf?v=7952.9 (Accessed on 10 December 2020).

Marabou, JP. 2006. nutrition and human development. *Nutrition Reviews* 64(5 Pt 2): 72–9.

Marcus, JB. 2013. *Chapter 1* - Nutrition basics: What is inside food, how it functions and healthy guidelines: The nutrients in foods and beverages in healthy cooking and baking. Available at: https://doi.org/10.1016/B978-0-12-391882-6.00001-7 (Accessed on 1 July 2022).

Marques-Vidal, P, Waeber, G, Vollenweider, P & Guessous, I. 2018. Socio-demographic and lifestyle determinants of dietary patterns in French-speaking Switzerland, 2009-2012. *BMC Public Health* 18: 131-145.

Martíne, SE, Popkin, BM, Swinburn, B & Monteiro, CA. 2017. The share of ultra-processed foods and the overall nutritional quality of diets in the US: evidence from a nationally representative cross-sectional study. *Population Health Metrics* 15(6): 32-45.

Masquelier, B, Waltisperger, D, Ralijaona, O, Pison, G & Ravélo, A. 2014. The epidemiological transition in Antananarivo, Madagascar: an assessment based on death registers (1900-2012). *Global Health Action* 2014: 7-21.

Mendonça, RD, Pimenta, AM, Gea, A, De la Fuente-Arrillaga, C, Martinez-Gonzalez, MA, Lopes AC & Bes-Rastrollo, M. 2016.Ultraprocessed food consumption and risk of overweight and obesity: the University of Navarra Follow-Up (SUN) cohort study. *American Journal of Clinical Nutrition* 104(5):1433-1440.

Mengistie, BT, Mol, APJ & Oosterveer, P. 2017. Pesticide use practices among smallholder vegetable farmers in Ethiopian Central Rift Valley. *Environment, Development and Sustainability* 19: 301–324.

Me-Nsope, N.M. 2014. *Trends and determinants of food consumption patterns in West Africa.* Michigan: Michigan State University.

Mertens, E, Colizzi, C & Peñalvo, JL. 2022. Ultra-processed food consumption in adults across Europe. *European Journal of Nutrition* 61: 1521–1539.

Micha, R, Wallace, SK & Mozaffarian, D. 2010. Red and processed meat consumption and risk of incident coronary heart disease, stroke, and diabetes mellitus: a systematic review and meta-analysis. *Circulation* 121(21): 2271–2283.

Milford, AB, Le Mouel, C, Bodirsky, BL & Rolinski, S. 2019. Drivers of meat consumption. *Appetite* 141: 10403-10413.

Miller, V, Reedy, J, Cudhea, F, Zhang, J, Shi, P, Erndt-Marino, J, Coates, J, Micha, R, Webb, P, Mozaffarian, D & Global Dietary Database. 2022. Global, regional, and national consumption of animal-source foods between 1990 and 2018: findings from the Global Dietary Database. *The Lancet Planetary Health* 6(3): e243–e256.

Ministry of Agriculture and Rural Development. (MoARD). 2009. *Ethiopian food security program (2010- 2014) final.* Addis Ababa: MoARD.

Ministry of Finance and Economic Development. (MoFED). 2006. *Ethiopia: Building on progress a plan for accelerated and sustained development to end poverty (PASDEP*). Addis Ababa: MoFED.

Ministry of Finance and Economic Development. (MoFED). 2010. *Growth and transformation plan: 2010/11-2014/15.* Addis Ababa: MoFED.

Minten, B, Dereje, M, Bachewe, FN & Tamru, S. 2018. *Evolving food systems in Ethiopia: Past, present, and future.* Washington, DC: IFPRI & EDRI.

Mirowsky, J & Ross, CE. 1998. Education, personal control, lifestyle, and health: a human capital hypothesis. *Research on Aging* 20(4): 415–449.

Misganaw, A, Haregu, T, Deribe, K & Npca, T. 2017. National mortality burden due to communicable, non-communicable, and other diseases in Ethiopia, 1990-2015: Findings from the Global Burden of Disease Study 2015. *Population Health Metrics* 15: 145-159.

Misganaw, A, Mariam, DH & Araya, T. 2012. The double mortality burden among adults in Addis Ababa, Ethiopia, 2006-2009. *Preventing Chronic Disease* 9:84-98.

MoARD (Ministry of Agriculture and Rural Development (MoARD). 2013. *Agricultural Growth Program (AGP) - Program Implementation Manual (PIM).* Addis Ababa: Ministry of Agriculture and Rural Development (MoARD).

Monsivais, P & Drewnowski A. 2009. Lower-energy-density diets are associated with higher monetary costs per kilocalorie and are consumed by women of higher socioeconomic status. *Journal of the American Dietician Association* 109(5):814-822.

Monteiro, CA. 2009. Nutrition and health. The issue is not food, nor nutrients, so much as processing. *Public Health Nutrition* 12(5):729-731.

Monteiro, CA, Cannon, G, Lawrence, M, Costa Louzada, M, & Pereira, MP. 2019. *Ultra-processed foods, diet quality, and health using the NOVA classification system.* Rome: FOA.

Monteiro, CA, Cannon, G, Levy, R, Moubarac, JC, Jaime, P, Martins, AP, Canella, D, Louzada, M & Parra, D. 2016. NOVA. The star shines bright. *World Nutrition 7*(1-3): 28-38.

Monteiro, CA, Cannon, G, Moubarac, JC, Levy, RB, Louzada, MLC & Jaime, PC. 2018. The UN Decade of Nutrition, the NOVA food classification, and the trouble with ultra-processing. *Public Health Nutrition* 21(1): 5–17.

Monteiro, CA, Levy, RB, Claro, RM, Castro, IR & Cannon, G. 2010. A new classification of foods based on the extent and purpose of their processing. *Cadernos De Saude Publica* 26(11): 2039–2049.

Monteiro, CA, Moubarac, JC, Cannon, G, Ng, SW & Popkin, B. 2013, Ultra-processed products: global dominance. *Obesity Review* 14: 21-28.

Morgan, AE & Fanzo, J. 2020. Nutrition transition and climate risks in Nigeria: moving towards food systems policy coherence. *Current Environmental Health Reports* 7: 392–403.

Moser, K, Shkolnikov, V & Leon, DA. 2005. World mortality 1950-2000: divergence replaces convergence from the late 1980s. *Bulletin of the World Health Organization* 83(3): 202–209.

Mouttapa, M & Wallace, S. 2017. Comparisons between married and never married women employed in two southern California universities on frequencies of food and beverage consumption: implications for health. *Journal of Food and Nutrition Research* 5(2): 80-85.

Mudombi-Rusinamhodzi, G & Rusinamhodzi, L. 2022. Food sovereignty in sub-Saharan Africa: Reality, relevance, and practicality. Available at:

https://www.frontiersin.org/articles/10.3389/fagro.2022.957011. (Accessed on 10 December 2022).

Mufunda, J, Chatora, R, Ndambakuwa, Y, Nyarango, P, Chifamba, J, Kosia, A & Sparks, HV. 2006. Prevalence of noncommunicable diseases in Zimbabwe: results from analysis of data from the National Central Registry and Urban Survey. *Ethnicity & Disease* 16(3): 718–722.

Must, A, Spadano, J, Coakley, EH, Field, AE, Colditz, G & Dietz, WH.1999. The disease burden associated with overweight and obesity. *Journal of the American Medical Association* 282(16):1523–1529.

Mutsikiwa, M & Basera, CH. 2012. The influence of socio-cultural variables on consumers' perception of halal food products: a case of Masvingo urban, Zimbabwe. *International Journal of Business and Management* 7:112–119.

National Bank of Ethiopia (NBE). 2018. 2017/2018 Annual Report. Available at: https://nbebank.com/wp-content/uploads/pdf/annualbulletin/Annual%20Report%202017-2018/Annual-report-2017-2018.pdf (Accessed on 12 January 2021).

National Planning Commission (NPC). 2016. *Growth and transformation plan II, 2016.* Addis Ababa: NPC.

National Planning Commission. (NPC). 2018. *The second growth and transformation plan (GTP II): Midterm review report.* Addis Ababa: NPC.

National Research Council. 1989. Subcommittee on the tenth edition of the recommended dietary allowances. recommended dietary allowances. Available at: https://www.ncbi.nlm.nih.gov/books/NBK234938/ (Accessed on 12 January 2021).

NCD Risk Factor Collaboration. (NCD-RisC). 2016. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19·2 million participants. *Lancet* 387(10026), 1377–1396.

Nel, JH & Steyn, NP. 2022. The nutrition transition and the double burden of malnutrition in Sub-Saharan African countries: how do these countries compare with the recommended Lancet commission global diet? *International Journal of Environmental Research and Public Health* 19(24): 167-191.

Neumann, C, Harris, DM & Rogers, LM. 2002. Contribution of animal source foods in improving diet quality and function in children in the developing world. *Nutrition Research* 22(1-2): 193-220.

Ng, M, Fleming, T, Robinson, M, Thomson, B, Graetz, N & Margono, C. 2015. Global, regional, and national prevalence of overweight and obesity in children and adults 1980-2013: A systematic analysis. *Lancet* 384(9945): 766–781.

Nilsson, LM & Evengård, B. 2015. Food security or food sovereignty: what is the main issue in the Arctic. in, *The new Arctic*, edited by B Evengård, J Nymand Larsen & O, Paasche. Cham: Springer.

Nyberg, ST, Batty, GD, Pentti, J, Virtanen, M, Alfredsson, L, Fransson, EI, Goldberg, M, Heikkilä, K, Jokela, M, Knutsson, A, Koskenvuo, M, Lallukka, T, Leineweber, C, Lindbohm, JV, Madsen, IEH, Magnusson Hanson, LL, Nordin, M, Oksanen, T, Pietiläinen, O, Rahkonen, O & Kivimäki, M. 2018. Obesity and loss of disease-free years owing to major non-communicable diseases: a multicohort study. *The Lancet Public Health* 3(10): e490–e497.

Olshansky, SJ, Carnes, BA, Rogers, RG & Smith, L. 1998. Emerging infectious diseases: the fifth stage of the epidemiologic transition? *World Health Statistics Quarterly* 51(2, 3, 4): 207 – 217.

Olson, CM, Bove, CF & Miller, E O. 2007. Growing up poor: long-term implications for eating patterns and body weight. *Appetite* 49(1): 198–207.

Omran, AR. 1971. The epidemiologic transition. A theory of the epidemiology of population change. *Milbank Quarterly* 49(4): 509–538.

Oosterveer, P & Sonnenfeld, DA. 2012. *Food, globalization, and sustainability*. London: Earthscan.

Ord, JK & Getis, A. .2001. Testing for local spatial autocorrelation in the presence of global autocorrelation. *Journal of Regional Science* 41(3): 411-432.

Owino, V, Kumwenda, C, Ekesa, B, Parker, M, Ewoldt, L, Roos, N, Lee, W & Tome, D. 2022. The impact of climate change on food systems, diet quality, nutrition, and health outcomes: A narrative review. *Frontiers in Climate* 4:94-184.

Öz, M, Ucak, İ & Nayik, GA. 2022. PUFA and MUFA, in *Nutraceuticals and health care*, edited by J. Kour & G Nayik. London: Academic Press.

Pagliai, G, Dinu, M, Madarena, M, Bonaccio, M, Iacoviello, L & Sofi, F. 2021. Consumption of ultra-processed foods and health status: A systematic review and meta-analysis. *British Journal of Nutrition* 125(3): 308-318.

Pan, A, Sun, Q, Bernstein, AM, Schulze, MB, Manson, JE, Willett, WC & Hu, FB. 2011. Red meat consumption and risk of type 2 diabetes: 3 cohorts of US adults and an updated meta-analysis. *The American Journal of Clinical Nutrition* 94(4): 1088–1096.

Paula, LG & Margaret, EB. 2001. The nutrition transition is underway in India. *Journal of Nutrition* 131(10): 2692-2700.

Pearson, N, Ball, K & Crawford, D. 2012. Parental influences on adolescent fruit consumption: the role of adolescent self-efficacy. *Health Education Research* 27:14–23.

Piernas, C & Popkin, BM. 2011. Increased portion sizes from energy-dense foods affect total energy intake at eating occasions in US children and adolescents: patterns and trends by age group and sociodemographic characteristics, 1977–2006. *The American Journal of Clinical Nutrition* 94(5): 1324-1332.

Pimbert, M. 2009. *Towards food sovereignty: Key highlights in sustainable agriculture and natural resource management.* London: International Institute for Environment and Development.

Pingali, P & Yasmeen, K. 2004. *Globalisation of Indian diets and the transformation of food supply systems*. Rome: FAO.

Platform for Agricultural Risk Management. 2016. *Managing risks to improve farmers' livelihoods; Ethiopia agricultural risk profile. A*ddis Ababa: PARM.

Poore, J & Nemecek, T. 2018. Reducing food's environmental impacts through producers and consumers. *Science* 360:987–92.

Popkin, BM. 1993. Nutritional patterns and transitions. *Population and Development Review* 19(1): 138-157.

Popkin, BM. 1999. Urbanisation, lifestyle changes and the nutrition transition. *World Development* 27(11):1905-1916.

Popkin, BM. 2001. Nutrition in transition: the changing global nutrition challenge. *Asia Pacific Journal of Clinical Nutrition* 10:13-18.

Popkin, BM. 2002. An overview on the nutrition transition and its health implications: the Bellagio meeting. *Public Health Nutrition* 5(1): 93–103.

Popkin, BM. 2003. The nutrition transition in the developing world. *Development Policy Review* 21(5-6): 581-597.

Popkin, BM. 2004. The nutrition transition and the global shift towards obesity. *Diabetes Voice* 49(3): 81-97.

Popkin, BM. 2006a. Global nutrition dynamics: the world is shifting rapidly toward a diet linked with non-communicable diseases. *The American Journal of Clinical Nutrition* 84(2): 289-298.

Popkin, BM. 2006b. Technology, transport, globalization, and the nutrition transition food policy. *Food Politics* 31: 554–569.

Popkin, BM. 2008. *The nutrition transition and its relationship to demographic change. Nutrition and health in developing countries.* London: Humana Press.

Popkin, BM. 2009. Global changes in diet and activity patterns as drivers of the nutrition transition, in *Emerging societies – coexistence of childhood malnutrition and obesity* edited by SC Kalhan, AM Prentice & CS Yajnik. Basel: Nestec.

Popkin, BM. 2015. Nutrition transition and the global diabetes epidemic. *Current Diabetes Reports 5*(9): 64-78.

Popkin, BM, Adair, LS & Ng, SW. 2012. Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews* 70: 3-21.

Popkin, BM, Corvalan, C & Grummer-Strawn, LM. 2020. Dynamics of the double burden of malnutrition and the changing nutrition reality. *The Lancet* 395(10217):.65-74.

Popkin, BM & Du, S. 2003. Dynamics of the nutrition transition toward the animal foods sector in China and its implications: a worried perspective. *Journal of Nutrition* 133(11 Suppl 2): 3898-3906.

Popkin, BM & Gordon-Larsen, P. 2004. The nutrition transition: worldwide obesity dynamics and their determinants. *International Journal of Obesity* 28: S2–S9.

Popkin, BM & Hawkes, C. 2016. Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. *The Lancet. Diabetes & Endocrinology* 4(2): 174–186.

Popkin, BM & Ng, SW. 2022. The nutrition transition to a stage of high obesity and noncommunicable disease prevalence dominated by ultra-processed foods is not inevitable. *Obesity Reviews* 23(1):133-166.

Popkin, BM, Richards, MK & Monteiro, CA .1996. Stunting is associated in children of four nations that are undergoing nutrition transition. *Journal of Nutrition* 126: 3009-3016.

Poskitt, EM. 2009. Countries in transition: underweight to obesity non-stop? *Annual Review of Tropical Paediatrics* 29:1–11.

Prentice, AM. 2006. The emerging epidemic of obesity in developing countries. *International Journal of Epidemiology* 35(1): 93–9.

Puska, P. 2002. Nutrition and global prevention on non-communicable diseases. *Asia Pacific Journal of Clinical Nutrition* 11: S755–S758.

Raru, TB, Ayana, GM, Merga, BT, Negash, B, Deressa, A, Birhanu, A, Hassen, FA & Roba, KT. 2022. Magnitude of under-nutrition among under five children in Ethiopia based on 2019 Mini-Ethiopia Demographic and Health Survey: Generalized Linear Mixed Model (GLMM). Available at: https://doi.org/10.1186/s40795-022-00598-5. (Accessed on 21 November 2020).

Raschke, V & Cheema, B. 2008. Colonisation, the new world order, and the eradication of traditional food habits in East Africa: historical perspective on the nutrition transition. *Public Health Nutrition* 11(7): 662–674.

Rashid, S & Negassa, A. 2011. *Policies and performance of Ethiopian cereal markets*. Addis Ababa: IFPRI.

Reardon, T, Tschirley, D, Liverpool-Tasie, LSO, Awokuse, T, Fanzo, J, Minten, B, Vos, R, Dolislager, M, Sauer, C, Dhar, R, Vargas, C, Lartey, A, Raza, A & Popkin, BM. 2021. The processed food revolution in African food systems and the double burden of malnutrition. *Global Food Security* 28:100-114.

Reddy, S & Anitha, M. 2015. Culture and its influence on nutrition and oral health. *Biomedical Pharmaceutical Journal* 8: 10-15.

Renzaho, AM. 2004. Fat, rich and beautiful: changing socio-cultural paradigms associated with obesity risk, nutritional status, and refugee children from sub-Saharan Africa. *Health Place*10:105–113.

Rischke, R, Kimenju, SC, Klasen, S & Qaim, M. 2015. Supermarkets and food consumption patterns: the case of small towns in Kenya. *Food Policy* 52: 9–21.

Robins, CS, Ware, NC, dos Reis, S, Willging, CE, Chung, JY & Lewis-Fernández. R. 2008. Dialogues on mixed-methods and mental health services research: anticipating challenges, building solutions. *Psychiatric Services* 59(7): 727-31.

Rolfe, G. .2006. Validity, trustworthiness, and rigour: quality and the idea of qualitative research. *Journal of Advanced Nursing* 53: 304-310.

Sarfo, J, Pawelzik, E & Keding, GB. 2021. Dietary patterns as characterised by food processing levels and their association with the health outcomes of rural women in East Africa. *Nutrients* 13(8): 28-66.

Schmidhuber, J & Shetty, P. 2005. The nutrition transition to 2030. Why developing countries are likely to bear the major burden. *Acta Agriculturae Scandinavica* 2(3-4): 150-166.

Schmidhuber, J & Traill, WB. 2006. The changing structure of diets in the European Union in relation to healthy eating guidelines. *Public Health & Nutrition* 9:584–595.

Schmidt, E, Dorosh, P, Jemal, K & Smart, J. 2018. *Ethiopia's spatial and structural transformation: Public policy and drivers of change.* Washington, DC: IFPRI.

Schmidt, E, Dorosh, P, Jemal, K, Mekamu. M & Smart, J. 2020. Urbanisation and structural transformation, in Dorosh, PA & Minten, B. (Eds). *Ethiopia's agrifood system: Past trends, present challenges, and future scenarios*. Washington, DC: IFPRI.

Schrecker, T & Bambra, C. 2015. *How politics makes us sick: Neoliberal epidemics.* London: Palgrave.

Sedentary Behaviour Research Network. 2012. Letter to the editor: Standardized use of the terms sedentary and sedentary behaviours. *Applied Physiology, Nutrition & Metabolism* 37(3): 540–542.

Shapiro, BI, Gebru, G, Desta, S, Negassa, A, Nigussie, K, Aboset, G & Mechale, H. 2017. *Ethiopia livestock sector analysis.* Nairobi: ILRI.

Shekar, M & Popkin, B. 2020. *Obesity, health, and economic consequences of an impending global challenge*. Washington: World Bank.

Sherwood, S, Arce, AMG, Berti, P & Bekkering, E. 2013. Tackling the new materiality: modern food and counter-movements in Ecuador. *Journal of Food Policy* 41:1–10.

Shiferaw, A. 2017. *Productive capacity and economic growth in Ethiopia.* New York: United Nations Department of Economic and Social Affairs.

Sievert, K, Lawrence, M, Naika, A & Baker, P. 2019. Processed foods and nutrition transition in the Pacific: regional trends, patterns, and food system drivers. *Nutrients* 11(6): 13-28.

Simões, BDS, Barreto, SM, Molina, MDCB, Luft, VC, Duncan, BB, Schmidt, MI, Benseñor, IJM, Cardoso, LO, Levy, RB & Giatti, L. 2018. Consumption of ultra-processed foods and socioeconomic position: a cross-sectional analysis of the Brazilian Longitudinal Study of Adult Health. Available at: https://doi.org/10.1590/0102-311X00019717. (Accessed on 21 November 2020).

Sinha, R, Cross, AJ, Graubard, BI, Leitzmann, MF & Schatzkin, A. 2009. Meat intake and mortality: a prospective study of over half a million people. *Archives of Internal Medicine* 169(6): 562–571.

Slavin J. 2004. Whole grains and human health. *Nutrition Research Reviews* 17(1): 99–110.

Sodjinou, R, Agueh, V, Fayomi, B & Delisle, H. 2009. Dietary patterns of urban adults in Benin: relationship with overall diet quality and socio-demographic characteristics. *European Journal of Clinical Nutrition* 63(2): 222–228.

Soethoudt, H, van der Riet, J, Sertse, Y & Groot, J. 2013. *Food processing in Ethiopia.* Wageningen: UR Food & Biobased Research.

Statista Search Department. 2023. Soft drinks consumption in Africa as of 2018. Available at: https://www.statista.com/statistics/1248150/soft-drinks-consumption-in-africa-by-country/ (Accessed on 10 June 2023).

Steyn, NP, Bradshaw, D, Norman, R, Joubert, JD, Schneider, M & Steyn, K. 2006. *Dietary changes and the health transition in South Africa: implications for health policy, the double burden of malnutrition: case studies from six developing countries:* Rome: FAO.

Stifel, D & Woldehanna, T. 2014. *Utility-consistent poverty in Ethiopia, 2000–11: welfare improvements in a changing economic landscape.* Addis Ababa: WIDER.

Streeter, JL. 2017. Socioeconomic factors affecting food consumption and nutrition in China: Empirical evidence during the 1989–2009 period. *The Chinese Economy* 50(3): 168-192.

Sun, Y, Neelakantan, N, Wu, Y, Lote-Oke, R, Pan, A, van Dam, RM. 2015. Palm oil consumption increases low-density lipoprotein cholesterol compared with vegetable oils low in saturated fat in a meta-analysis of clinical trials. *Journal of Nutrition* 145(7):1549–1558.

Swinburn, BA, Caterson, I, Seidell, JC, & James, WP. 2004. Diet, nutrition and the prevention of excess weight gain and obesity. *Public Health & Nutrition* 7(1A), 123–146.

Swinburn, BA, Sacks, G & Ravussin, E. 2009. Increased food energy supply is more than sufficient to explain the US epidemic of obesity. *American Journal of Clinical Nutrition* 90:1453–1456.

Swinburn, BA, Sacks, G, Hall, KD, McPherson, K, Finegood, DT, Moodie, ML, & Gortmaker, S. L. 2011. The global obesity pandemic: shaped by global drivers and local environments. *Lancet* 378(9793): 804–814.

Swinkels, T. 2016. *The role of multinational corporations in achieving the Sustainable Development Goals: A case Study of Heineken, Diageo, Bavaria and BGI in Ethiopia.* Amsterdam: University of Amsterdam.

Tamru, S, Minten, B, Bachewe, F, & Alemu D. 2017. The rapid expansion of herbicide uses in smallholder agriculture in Ethiopia: Patterns, drivers, and implications. *European Journal of Development Research* 29(3): 628-647.

The Sustainable Food Systems Programme (SFS). 2018. Available at: http://www.fao.org/fsnforum/sites/default/files/files/155_understanding-sustainable-food-systems/Draft_SFS_Glossary_v22NOV2018.pdf (Accessed on 15 September 2019).

Thow, AM. 2009. Trade liberalisation and the nutrition transition: Mapping the pathways for public health nutritionists. *Public Health & Nutrition* 12: 2150-2158.

Tidåker, P, Potter, HK, Carlsson, G & Röös, E. 2021. Towards sustainable consumption of legumes: How origin, processing and transport affect the environmental impact of pulses. *Sustainable Production & Consumption* 27: 1-17.

Tieri, M, Ghelfi, F, Vitale, M, Vetrani, C, Marventano, S, Lafranconi, A, Godos, J, Titta, L, Gambera, A, Alonzo, E, Sciacca, S, Riccardi, G, Buscemi, S, Del Rio, D, Ray, S, Galvano, F, Beck, E & Grosso, G. 2020. Whole grain consumption and human health: an umbrella review of observational studies. *International Journal of food Sciences & Nutrition* 71(6): 668–677.

Tilman, D & Clark, M. 2014, Global diets link environmental sustainability and human health. *Nature* 515: 518–522.

Tschirley, D, Reardon, T, Dolislager, M & Snyder, J. 2015. The rise of a middle class in East and Southern Africa: implications for food system transformation. *Journal of International Development* 27(5): 628-646.

Turner, C, Aggarwal, A, Walls, H, Herforth, A, Drewnowski, A, Coates, J, Kalamatianou, S & Kadiyala, S. 2018. Concepts and critical perspectives for food environment research: a global framework with implications for action in low- and middle-income countries. *Global Food Security* 18:93–101.

Turrell, G, Hewitt, B, Patterson, C, Oldenburg, B, & Gould, T. 2002. Socioeconomic differences in food purchasing behaviour and suggested implications for diet-related health promotion. *Journal of Human Nutrition & Diet* 15: 355–364.

United Nations Department of Economic and Social Affairs (UNDESA). 2020. Population databases. Available at: https://population.un.org/wup/Download/ (Accessed on 28 December 2020).

United Nations Environment Programme (UNEP). 2022. *Synthesis report on the environmental and health impacts of pesticides and fertilizers and ways to minimize them.* Geneva: UNEP.

United Nations Children's Fund (Unicef). 1990. *A UNICEF policy review: Strategy for improved nutrition of children and women in developing countries*. New York: Unicef.

United Nations Children's Fund (Unicef), World Health Organization (WHO) & World Bank. 2023. Levels and trends in child malnutrition Joint Child Malnutrition Estimates Key findings of the 2023 edition. Available at: https://data.unicef.org/resources/jme-report-2023/ (Accessed on 28 June 2023).

United Nations Statistics Division. 2016. Environmental indicators. Available at: https://unstats.un.org/unsd/environment/totalarea.htm (Accessed on 13 January 2021).

United States Department of Agriculture Foreign Agricultural Service. (USDA). 2017. Ethiopia's Ag Imports Continue Growing. GAIN. Available at: https://agriexchange.apeda.gov.in/marketreport/Reports/Ethiopia%E2%80%99s_Ag_Imports_Continue_Growing_Addis_Ababa_Ethiopia_2-7-2017.pdf (Accessed on 02 June 2023).

United States Department of Agriculture. 2018. Ethiopia fresh fruits market update report. Available at: http://agriexchange.apeda.gov.in/MarketReport/Reports/Ethiopia_Fresh_Fruits_Market_Update_Report%20_Addis_Ababa_Ethiopia_9-21-2018.pdf. (Accessed on 13 January 2021).

United States Department of Agriculture. 2020. *Grain and feed annual report.* Washington: USDA Foreign Agriculture Service.

Urdal, H & Hoelscher, K. 2009. *Urban youth bulges and social disorder – an empirical study of Asian and Sub-Saharan African cities.* Washington: World Bank.

Valicente, VM, Peng, CH, Pacheco, KN, Lin, L, Kielb, EI, Dawoodani, E, Abdollahi, A, & Mattes, RD. 2023. Ultra processed Foods and obesity risk: a critical review of reported mechanisms. *Advances in Nutrition* 14(4): 718–738.

Vartanian, LR, Schwartz MB, & Brownell KD. 2007. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *American Journal of Public Health* 97:667-675.

Ventura, AK & Mennella, JA. 2011. Innate and learned preferences for sweet taste during childhood. *Current Opinion in Clinical Nutrition and Metabolic Care* 14(4): 379–384.

Vergnaud, AC, Norat, T, Romaguera, D, Mouw, T, May, AM, Travier, N, Luan, J, Wareham, N, Slimani, N, Rinaldi, S, Couto, E, Clavel-Chapelon, F, Boutron-Ruault, MC, Cottet, V, Palli, D, Agnoli, C, Panico, S, Tumino, R, Vineis, P, Agudo, A & Peeters, PH. 2010. Meat consumption and prospective weight change in participants of the EPIC-PANACEA study. *The American Journal of Clinical Nutrition* 92(2): 398–407.

Vonke, D. 2011. The paradox of malnutrition in developing countries. *African Research Review* 5(19): 40-48.

Vorster, HH, Bourne, LT, Venter, CS & Oosthuizen, W. 1999 Contribution of nutrition to the health transition in developing countries: a framework for research and intervention. *Nutrition Review* 57:341–349.

Vorster, HH, Kruger, A & Margetts, BM. 2011. The nutrition transition in Africa: Can it be steered into a more positive direction? *Nutrients* 3: 429-441.

Walls, HL, Baker, P & Parkhurst, J. 2018. Addressing trade policy as a macro-structural determinant of health: the role of institutions and ideas. *Global Social Policy* 18(1): 94–101.

Wang, Y & Beydoun, MA. 2009. Meat consumption is associated with obesity and central obesity among US adults. *International Journal of Obesity* 33(6): 621–628.

Wardle, J, Haase, AM, Steptoe, A, Nillapun, M, Jonwutiwes, K & Bellisie, F. 2004. Gender differences in food choice: the contribution of health beliefs and dieting. *Annals of Behavioural Medicine* 27: 107-116.

Waterlander, WE, Jiang, Y, Nghiem, N, Eyles, H, Wilson, N, Cleghorn, C, Genç, M, Swinburn, B, Mhurchu, CN & Blakely, T. 2019. The effect of food price changes on consumer purchases: a randomised experiment. *The Lancet. Public Health* 4(8), e394–e405.

Webster, JL, Dunford, EK & Neal, BC. 2010. A systematic survey of the sodium contents of processed foods. *American Journal of Clinical Nutrition* 91: 413–420.

Weeks, JR. 2014. *Population: an introduction to concepts and issues*. New York: Cengage Learning.

Weickert, J. 2012. Demographic transition in Ethiopia - challenges for the education system and responses. *Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik* 35 (1): 15-23.

Wiig, K & Smith, C. 2009. The art of grocery shopping on a food stamp budget: Factors influencing the food choices of low-income women as they try to make ends meet. *Public Health Nutrition* 12(10):1726-1734.

Willett, WC & Liu, S. 2019. Carbohydrate quality and health: distilling simple truths from complexity. *American Journal of Clinical Nutrition* 110: 803–804.

Willett, WC, Rockström, J, Loken, B, Springmann, M, Lang, T, Vermeulen, S, Garnett, T, Tilman, D, DeClerck, F, Wood, A, Jonell, M, Clark, M, Gordon, LJ, Fanzo, J, Hawkes, C, Zurayk, R, Rivera, JA, De Vries, W, Majele Sibanda, L, Afshin, A & Murray, CJL. 2019. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *Lancet* 393(10170): 447–492.

Winship, C & Radbill, L. 1994. Sampling weights and regression analysis. *Sociological Methods & Research* 23(2): 230–257.

Wisdom, J & Creswell, JW. 2013. Mixed methods: integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models. Available at: https://www.ahrq.gov/sites/default/files/wysiwyg/ncepcr/tools/PCMH/mixed-methods.pdf (Accessed on 02 June 2023).

Woessmann, L. 2015. The economic case for education. Available at: http://www.tandfonline.com/doi/abs/10.1080/09645292.2015.1059801?journalCode=cede20 (Accessed on 02 June 2023).

Worku, IH, Dereje, M, Minten, B &Hirvonen, K. 2017. Diet transformation in Africa: the case of Ethiopia. *Agricultural Economics* 48: 73-86.

World Bank. 2007. *Explaining sources of food price inflation in Ethiopia: a just in time policy note.* Washington, DC: World Bank.

World Bank. 2009. *Towards the competitive frontier, improving Ethiopia's investment climate*. Washington, DC: World Bank.

World Bank. 2015. *Ethiopia urbanisation review: urban institutions for a middle-income Ethiopia.* Washington, DC: World Bank.

World Bank. 2017. *World Bank Group country partnership framework for the Democratic Republic of Ethiopia 2018-2022*. Available at: http://documents.worldbank.org/curated/en/202771504883944180/pdf/119576-revised-Ethiopia-Country-Partnership-Web.pdf (Accessed on 3 July 2019).

World Bank. 2020. World Development Indicators. Available at: https://databank.worldbank.org/source/world-development-indicators. (Accessed on 23 December 2020).

World Bank. 2022. New World Bank country classifications by income level: 2022-2023. Available at: https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2022-2023 (Accessed on 30 June 2023).

World Bank & Cities Alliance. 2015. *Ethiopia urbanisation review: urban institutions for a middle-income Addis Ababa.* Washington, DC: World Bank.

World Food Programme. 2019. Ethiopia: comprehensive food security and vulnerability assessment. Addis Ababa. Available at: https://reliefweb.int/report/ethiopia/ethiopia-comprehensive-food-security-and-vulnerability-analysis-cfsva-2019. (Accessed on 12 December 2020).

World Health Organization. (WHO). 1985. *Energy and protein requirements. Report of a Joint FAO/WHO/UNU Expert Consultation.* Geneva: WHO.

World Health Organization. (WHO). 2005. *The SuRF Report 2. Surveillance of chronic disease risk factors: country-level data and comparable estimates.* Geneva: WHO.

World Health Organization. (WHO). 2011. Noncommunicable diseases country profiles 2011. Available at: https://apps.who.int/iris/bitstream/handle/10665/44704/9789241502283_eng.pdf?sequence=1(Accessed on 30 January 2023).

World Health Organization. (WHO). 2015*. Guideline: sugars intake for adults and children*. Available at: https://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028_eng.pdf?sequence=1 (Accessed on 30 January 2023).

World Health Organization. (WHO). 2017. *The double burden of malnutrition: policy brief*. Geneva: WHO.

World Health Organization. (WHO). 2018a. Malnutrition key facts 2018. Available at: www.who.int/news-room/fact-sheets/detail/malnutrition. (Accessed on 30 January 2023).

World Health Organization. (WHO). 2018b. Noncommunicable diseases (NCD) country profiles, 2018. Available at: https://www.who.int/nmh/countries/eth_en.pdf?ua=1 (Accessed on 13 December 2020).

World Health Organization. (WHO). 2020a. Healthy diet. Available at: https://www.who.int/news-room/fact-sheets/detail/healthy-diet#:~:text=For%20adults&text=At%20least%20400%20g%20(i.e.,cassava%20and%20other%20starchy%20roots. (Accessed on 30 January 2023).

World Health Organization. (WHO). 2020b. Obesity and overweight. Available at: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight (Accessed on 16 June 2020).

World Health Organization. (WHO), 2020c. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. Available at: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020. (Accessed on 20 June 2023).

World Health Organization. (WHO). 2021. Obesity and overweight. Available at: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight (Accessed on 10 June 2023).

World Health Organization. (WHO). 2022. *European regional obesity report 2022.* Copenhagen: WHO Regional Office for Europe.

World Health Organization. (WHO). 2023. Five billion people unprotected from trans-fat leading to heart disease. Available at: https://www.who.int/news/item/23-01-2023-five-billion-people-unprotected-from-trans-fat-leading-to-heart-disease (Accessed on 7 July 2023).

World Health Organization (WHO) & Food and Agricultural Organisation (FAO). 2003. *Joint WHO-FAO expert consultation on diet, nutrition, and the prevention of chronic diseases.* Geneva: WHO.

Yahoo Finance. 2023. 20 countries with the highest soda consumption. Available at: https://finance.yahoo.com/news/20-countries-highest-soda-consumption-103854366.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAHUy4kboGqIVPPME0ONKpFyUiuCs5MO6

GIFPWSrPLTg_QQXW8G5F94bSDSYn432e8OIOe2_M3OKlyEAn_IfRekcdy_Dvnul3lBh8UbRMRNC0-yLBANdPSY1Iwetpf-4bZXUAwVpj4mYavvIOZYlr4brIfNazUcUVns0oK3CABgCU (Accessed on 10 June 2023).

Zhang, CQ, Zhang, R, Schwarzer, R & Hagger, MS. 2019.A meta-analysis of the health action process approach. *Health Psychology* 38(7): 623–637.

Zimmerman, C. 1932. Ernst Engel's law of expenditures for food. *The Quarterly Journal of Economics* 47(1): 78-101.

ANNEX 1: CLASSIFICATION OF FOOD GROUPS APPLIED FOR THE ANALYSIS OF THE PRESENT RESEARCH

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Cereals	Teff white, whole grain	1101101	white teff
Cereals	Teff white, flour	1101102	white teff
Cereals	Teff mixed, whole grain	1101103	Mixed teff
Cereals	Teff mixed, flour	1101104	Mixed teff
Cereals	Teff black, whole grain	1101105	Red teff
Cereals	Teff black, flour	1101106	Red teff
Cereals	Teff & other cereals, flour	1101107	Teff and other cereals
Cereals	Wheat white, whole grain	1101108	wheat
Cereals	Wheat white, flour	1101109	wheat
Cereals	Wheat mixed, whole grain	1101110	wheat
Cereals	Wheat mixed, flour	1101111	c wheat
Cereals	Wheat black, whole grain	1101112	wheat
Cereals	Wheat black, flour	1101113	wheat
Cereals	Wheat, split	1101114	wheat
Cereals	Wheat, roasted	1101115	wheat
Cereals	Wheat, boiled	1101116	wheat
Cereals	Wheat & Barley (Duragna), whole grain	1101117	wheat
Cereals	Wheat & Barley (Duragna), flour	1101118	wheat
Cereals	Wheat & other cereals, flour	1101119	wheat
Cereals	Barley white, whole grain	1101120	Barley
Cereals	Barley white, flour	1101121	Barley
Cereals	Barley mixed, whole grain	1101122	Barley
Cereals	Barley mixed, flour	1101123	Barley
Cereals	Barley black, whole grain	1101124	Barley
Cereals	Barley black, flour	1101125	Barley
Cereals	Barley, brewary type, whole grain	1101126	Barley
Cereals	Barely brewary type, flour	1101127	Barley
Cereals	Beso roasted & milled barely	1101128	Barley
Cereals	Barley, split	1101129	Barley
Cereals	Barley, roasted	1101130	Barley
Cereals	Barley, fresh	1101131	Barley
Cereals	Barley & others, flour	1101132	Barley
Cereals	Emmur wheat (aja), whole grain	1101133	Other cereals
Cereals	Emmur wheat, flour	1101134	Other cereals
Cereals	Emmur wheat, split	1101135	Other cereals
Cereals	Emmur wheat (Aja), roasted	1101136	Other cereals
Cereals	Hulled barley (Temege), whole grain	1101137	Other cereals
Cereals	Hulled barley (Temege), flour	1101138	Other cereals
Cereals	Oats (Sinar), flour	1101139	Other cereals

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Cereals	African millet, whole grain	1101140	Other cereals
Cereals	African millet, flour	1101141	Other cereals
Cereals	Maize, whole grain	1101142	Maize
Cereals	Maize, flour	1101143	Maize
Cereals	Maize, split	1101144	Maize
Cereals	Maize, roasted	1101145	Maize
Cereals	Maize, boiled	1101146	Maize
Cereals	Maize, fresh	1101147	Maize
Cereals	Maize & others, flour	1101148	Maize
Cereals	Popcorn (Fendisha), whole grain	1101149	Maize
Cereals	Sorghum, whole grain	1101150	Sorghum
Cereals	Sorghum, flour	1101151	Sorghum
Cereals	Sorghum, roasted	1101152	Sorghum
Cereals	Sorghum, boiled	1101153	Sorghum
Cereals	Durah, whole grain	1101154	Other cereals
Cereals	Durah, flour	1101155	Other cereals
Cereals	Flour, factory product, mainly of wheat	1101156	Factory processed flour
Cereals	Rice	1101158	Rice
Cereals	Others N.E.C., whole grain	1101197	Other cereals
Cereals	Others N.E.C., flour	1101198	Other cereals
Cereals	Injera	1101201	Injera
Cereals	Bread (Dufo, Anbasha etc), Wheat - home	1101202	Dabo
Cereals	Bread, other cereals - home made	1101203	Dabo
Cereals	Bread, wheat - bakery	1101204	Bread-bakery
Cereals	Bread, barley - bakery	1101205	Bread-bakery
Cereals	Spaghetti	1101301	Pasta
Cereals	Macaroni	1101302	Pasta
Cereals	Pastini & Ministroni	1101303	Pasta
Cereals	Telateli & Lazagna	1101304	Pasta
Cereals	Others N.E.C.	1101398	Pasta
Cereals	Barley, malt	1101401	Barley
Cereals	Barley, asharo	1101402	Barley
Cereals	Wheat, malt	1101403	wheat
Cereals	Maize, malt	1101404	Maize
Cereals	Maize, asharo	1101405	Maize
Pulses	Fava bean, whole grain	1102101	Roasted, boiled, germinated edible legume
Pulses	Fava beans, flour (shiro)	1102102	Legume used for preparation of sauce
Pulses	Fava beans, split (kik)	1102103	Legume used for preparation of sauce
Pulses	Chickpeas, whole grain	1102104	Roasted, boiled, germinated edible legume

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Pulses	Chickpeas, flour (shiro)	1102105	Legume used for preparation of sauce
Pulses	Chickpeas, split (kik)	1102106	Legume used for preparation of sauce
Pulses	Field peas, whole grain	1102107	Roasted, boiled, germinated edible legume
Pulses	Field peas, flour (shiro)	1102108	Legume used for preparation of sauce
Pulses	Field peas, split (kik)	1102109	Legume used for preparation of sauce
Pulses	Soya beans, whole grain	1102110	Roasted, boiled, germinated edible legume
Pulses	Soya beans, flour (shiro)	1102111	Legume used for preparation of sauce
Pulses	Soya beans, split (kik)	1102112	Legume used for preparation of sauce
Pulses	Lentils, whole grain	1102113	Roasted, boiled, germinated edible legume
Pulses	Lentils, split (kik)	1102114	Legume used for preparation of sauce
Pulses	Haricot / Kidney beans, whole grain	1102115	Roasted, boiled, germinated edible legume
Pulses	Haricot /Kidney beans, flour (shiro)	1102116	Legume used for preparation of sauce
Pulses	Haricot / Kidney beans, split (kik)	1102117	Legume used for preparation of sauce
Pulses	Grass peas, whole grain	1102118	Roasted, boiled, germinated edible legume
Pulses	Grass peas, flour (shiro)	1102119	Legume used for preparation of sauce
Pulses	Grass peas, split (kik)	1102120	Legume used for preparation of sauce
Pulses	Mixed pulses, flour (shiro)	1102121	Legume used for preparation of sauce
Pulses	Mixed pulses, split (kik)	1102122	Legume used for preparation of sauce
Pulses	Fenugreek, whole grain	1102123	Roasted, boiled, germinated edible legume
Pulses	Fenugreek, flour	1102124	Legume used for preparation of sauce
Pulses	Lupine (Gibto), whole grain	1102125	Roasted, boiled, germinated edible legume
Pulses	Others N.E.C., whole grain	1102196	Roasted, boiled, germinated edible legume
Pulses	Others N.E.C. flour (shiro)	1102197	Roasted, boiled, germinated edible legume
Pulses	Others N.E.C. split (kik)	1102198	Roasted, boiled, germinated edible legume
Pulses	Fava beans, roasted	1102201	Roasted, boiled, germinated edible legume
Pulses	Fava beans, boiled	1102202	Roasted, boiled, germinated edible legume
Pulses	Fava beans, germinated	1102203	Roasted, boiled, germinated edible legume
Pulses	Fava beans, fresh	1102204	Roasted, boiled, germinated edible legume
Pulses	Chickpeas, roasted	1102205	Roasted, boiled, germinated edible legume
Pulses	Chickpeas, boiled	1102206	Roasted, boiled, germinated edible legume

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Pulses	Chickpeas, germinated	1102207	Roasted, boiled, germinated edible legume
Pulses	Chickpeas, fresh	1102208	Roasted, boiled, germinated edible legume
Pulses	Field peas, roasted	1102209	Roasted, boiled, germinated edible legume
Pulses	Field peas, boiled	1102210	Roasted, boiled, germinated edible legume
Pulses	Field peas, fresh	1102211	Roasted, boiled, germinated edible legume
Pulses	Haricot /kidney beans, roasted	1102212	Roasted, boiled, germinated edible legume
Pulses	Haricot /kidney beans, boiled	1102213	Roasted, boiled, germinated edible legume
Pulses	Haricot /kidney beans, fresh	1102214	Roasted, boiled, germinated edible legume
Pulses	Grass peas, roasted	1102215	Roasted, boiled, germinated edible legume
Pulses	Grass peas, boiled	1102216	Roasted, boiled, germinated edible legume
Pulses	Mixed pulses, roasted	1102217	Roasted, boiled, germinated edible legume
Pulses	Mixed pulses, boiled	1102218	Roasted, boiled, germinated edible legume
Oilseeds	Nigro / Niger seed	1103101	oilseeds
Oilseeds	Linseed (Telba)	1103102	oilseeds
Oilseeds	Sesame	1103103	oilseeds
Oilseeds	Sunflower	1103104	oilseeds
Oilseeds	Ground nuts	1103105	oilseeds
Oilseeds	Rape seed	1103106	oilseeds
Animal source foods	Beef	1104101	Beef
Animal source foods	Sheep meat	1104102	Mutton and goat
Animal source foods	Goat Meat	1104103	Mutton and goat
Animal source foods	Camel Meat	1104104	Other meats
Animal source foods	Broth (Goden), ox / calf	1104105	Beef
Animal source foods	Dried / Canned meat	1104106	Other meats
Animal source foods	Wild animal meat	1104107	Other meats
Animal source foods	Liver & kidney, ox / calf	1104201	Offal
Animal source foods	Tongue & Sambre, ox / calf	1104202	Offal

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Animal source foods	Offal, ox / calf	1104203	Offal
Animal source foods	Chicken	1104301	Chicken
Animal source foods	Birds' meat	1104302	Other meats
Animal source foods	Others N.E.C.	1104398	Other meats
Animal source foods	Fresh or frozen fish, whole	1105101	Fish
Animal source foods	Fresh or frozen fish, internal organ cl	1105102	Fish
Animal source foods	Fresh or chilled fish, flat	1105103	Fish
Animal source foods	Dried fish	1105201	Fish
Animal source foods	Sardines & tuna, canned fish	1105202	Fish
Animal source foods	Cow milk, raw	1106101	Milk
Animal source foods	Camel milk, raw	1106102	Milk
Animal source foods	Goat milk, raw	1106103	Milk
Animal source foods	Sheep milk, raw	1106104	Milk
Animal source foods	Sour milk / cottage yoghurt	1106201	Milk
Animal source foods	Cottage cheese	1106202	Milk
Animal source foods	Whey (Aguat)	1106203	Milk
Animal source foods	Butter Milk (Arera)	1106204	Milk
Animal source foods	Powdered milk	1106301	Powdered Milk
Animal source foods	Eggs, Indigenous	1106401	Egg
Animal source foods	Eggs, non-Indigenous (hybrid)	1106402	Egg
Fats and oil	Butter, unspiced & non- refined	1107101	Butter
Fats and oil	Butter, unspiced but refined	1107102	Butter
Fats and oil	Butter, refined & spiced	1107103	Butter
Fats and oil	Edible oil, local	1107201	Edible oil
Fats and oil	Edible oil, imported	1107202	Edible oil
Fats and oil	Edible vegetable butter, local	1107203	Vegetable butter
Fats and oil	Edible vegetable butter, imported	1107204	Vegetable butter
Fats and oil	Maji mereq	1107205	Other fats

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Fats and oil	Others N.E.C.	1107298	Other fats
Fats and oil	Margarine	1107301	Other fats
Fats and oil	Ground nuts butter, diet	1107302	Other fats
Fruits	Banana	1108101	Banana
Fruits	Orange / Mandarin	1108102	Orange / Mandarin/Lemon
Fruits	Lemon	1108103	Orange / Mandarin/Lemon
Fruits	Peach	1108104	Other fruit
Fruits	Avocado	1108105	Avocado
Fruits	Papaya	1108106	Papaya
Fruits	Pineapple	1108107	Other fruit
Fruits	Guava	1108108	Other fruit
Fruits	Mango	1108109	Mango
Fruits	Watermelon	1108110	Other fruit
Fruits	Prickly pear (Belles)	1108111	Other fruit
Fruits	Pome (Apple)	1108112	Other fruit
Fruits	Citron	1108113	Other fruit
Fruits	Custard apple Gisheta	1108114	Other fruit
Fruits	Others N.E.C.	1108198	Other fruit
Fruits	Fruit powder any type	1108201	Other fruit
Fruits	Dates	1108202	Other fruit
Fruits	Kokor/ Gaba	1108203	Other fruit
Fruits	Palm (Akkat)	1108204	Other fruit
Vegetables	Ethiopian Kale	1109101	Green leafy vegetables
Vegetables	Head cabbage	1109102	Green leafy vegetables
Vegetables	Lettuce	1109103	Green leafy vegetables
Vegetables	Spinach	1109104	Green leafy vegetables
Vegetables	Cauliflower & switcher	1109105	Green leafy vegetables
Vegetables	Samma & Kenkez	1109106	Green leafy vegetables
Vegetables	Shiferaw/ Aleko	1109107	Green leafy vegetables
Vegetables	Edible wild vegetables & weeds	1109108	Other vegetables
Vegetables	Leek	1109110	Other vegetables
Vegetables	Green onion (Alenge Shinkurt)	1109111	Onions
Vegetables	Green beans	1109112	Other vegetables
Vegetables	Pepper green	1109113	Other vegetables
Vegetables	Pumpkin	1109114	Other vegetables
Vegetables	Beet root	1109115	Other vegetables
Vegetables	Carrot	1109116	Carrot
Vegetables	Tomato	1109117	Tomato
Vegetables	Onions	1109118	Onions
Vegetables	Garlic	1109119	Garlic
Vegetables	Mushroom	1109120	Other vegetables

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Vegetables	Others N.E.C.	1109198	Other vegetables
Roots, tubers, and stems	Irish potato, raw	1109201	Root, tubers, and stems
Roots, tubers, and stems	Sweet potato, raw	1109202	Root, tubers, and stems
Roots, tubers, and stems	Indigenous potatoes (Boyna, Agew or fur	1109203	Root, tubers, and stems
Roots, tubers, and stems	Taro (Godere), raw	1109204	Root, tubers, and stems
Roots, tubers, and stems	Qocho, raw	1109205	Root, tubers, and stems
Roots, tubers, and stems	Amicho, raw	1109206	Root, tubers, and stems
Roots, tubers, and stems	Bula flour	1109207	Root, tubers, and stems
Roots, tubers, and stems	Bula wet	1109208	Root, tubers, and stems
Roots, tubers, and stems	Yam (Boye), raw	1109209	Root, tubers, and stems
Roots, tubers, and stems	Anchote, raw	1109210	Root, tubers, and stems
Roots, tubers, and stems	Cassava (Bichi), raw	1109211	Root, tubers, and stems
Roots, tubers, and stems	Others N.E.C.	1109298	Root, tubers, and stems
Roots, tubers, and stems	Kocho bread	1109301	Root, tubers, and stems
Roots, tubers, and stems	Potato, boiled or fried	1109302	Root, tubers, and stems
Roots, tubers, and stems	Cactus leaves (Shilla beles), boiled, f	1109303	Root, tubers, and stems
Spices	Red pepper whole	1110101	Pepper
Spices	Red pepper flour	1110102	Pepper
Spices	Pepper sauce, Agro- industry	1110103	Pepper
Spices	Pepper sauce (dilih/ awaze) - Home made	1110104	Pepper
Spices	Birds eye chill whole	1110105	Pepper
Spices	Birds eye chill flour	1110106	Pepper
Spices	Black pepper	1110201	Pepper
Spices	Long Pepper	1110202	Pepper
Spices	White cumin	1110203	Spices
Spices	Black cumin	1110204	Spices
Spices	Ginger	1110205	Spices
Spices	Cloves	1110206	Spices
Spices	Cinnamon	1110207	Spices
Spices	Cardamon	1110208	Spices
Spices	Turmeric	1110209	Spices

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Spices	Rue	1110210	Spices
Spices	Coriander	1110211	Spices
Spices	Sacred basil	1110212	Spices
Spices	False cardamon	1110213	Spices
Spices	Mixed spices	1110214	Spices
Spices	Koseret	1110215	Spices
Spices	Celery (Savory, fennel, etc. leaves)	1110216	Spices
Spices	Others N.E.C.	1110298	Spices
Sugar sweetened and other energy dense foods	Sugar	1111101	Sugar
Sugar sweetened and other energy dense foods	Sugar cane	1111102	Other sugar source
Sugar sweetened and other energy dense foods	Honey, natural	1111103	Honey
Sugar sweetened and other energy dense foods	Marmalade	1111104	Jam
Sugar sweetened and other energy dense foods	Toffees, chocolate, chewing gum	1111201	Toffees, chocolate, chewing gum
Sugar sweetened and other energy dense foods	Edible ice & ice-cream	1111202	Fast foods
Sugar sweetened and other energy dense foods	Paste & pie, home made	1101206	Fried snacks
Sugar sweetened and other energy dense foods	Doughnut / bombolini	1101207	Fried snacks
Sugar sweetened and other energy dense foods	Samosa	1101208	Fried snacks
Sugar sweetened and other energy dense foods	Boresh (Dolchi)	1101209	cereals
Sugar sweetened and other energy dense foods	Pizzas	1101210	Fast food
Sugar sweetened and other energy dense foods	Cakes	1101211	Fast food sweet
Sugar sweetened and other energy dense foods	Biscuits	1101212	Fast food sweet

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Sugar sweetened and other energy dense foods	Cookies	1101213	Fast food sweet
Sugar sweetened and other energy dense foods	Baqlaba / Mushebek	1101214	Fast food sweet
Baby foods	Mitin flour, home made	1112101	Homemade baby food
Baby foods	Fafa/ Dube, balanced baby diet	1112102	Manufactured baby food
Baby foods	Cerefam, baby food	1112103	Manufactured baby food
Baby foods	Cerelac & Ates, baby food	1112104	Manufactured baby food
Salt	Salt	1113101	salt
Snack dressing	Canned tomato, sauce	1113102	Snack dressing
Snack dressing	Mustard (Senafich)	1113103	Snack dressing
Snack dressing	Vinegar/ Acheto	1113104	Snack dressing
Snack dressing	Baking powder	1113105	Snack dressing
Snack dressing	Ketchup & Myanez	1113106	Snack dressing
Snack dressing	Others N.E.C.	1113198	Snack dressing
Away from home food	Scramble egg / omelette (Enkulal firfir /	1121101	Fast food
Away from home food	Sandwich, meat/ egg/ vegetable, normal	1121102	Fast food
Away from home food	Burger / club sandwich	1121103	Fast food
Away from home food	Ful; sills	1121104	Fast food
Away from home food	Feta, Fetira	1121105	Fast food
Away from home food	Liver / Kidney, goat / sheep	1121106	Fast food
Away from home food	Offal, sheep / goat	1121107	Fast food
Away from home food	Tripe, stomach, ox / calf	1121108	Fast food
Away from home food	Firfir (Injera/ bread)	1121109	Fast food
Away from home food	Porridge, cereals	1121110	Fast food
Away from home food	Porridge /bula	1121111	Fast food
Away from home food	Kinche, Chiko or Beso	1121112	Fast food
Away from home food	Bread or any pastry products with hot d	1121113	Fast food
Away from home food	Key, Aicha, Misto wot, sheep / goat	1121114	Restaurant food
Away from home food	Kikil sheep / goat meat	1121115	Restaurant food

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Away from home food	Tibs, (fried), sheep / goat, normal	1121116	Restaurant food
Away from home food	Aresto, Shekla, Zilzil sheep / goat,	1121117	Restaurant food
Away from home food	Key, Alicha, Misto wot, beef	1121118	Restaurant food
Away from home food	Minchet Abish, Doro fenta, Shekla wot	1121119	Restaurant food
Away from home food	Mahberawi, Kornis, Obama, Agelgil	1121120	Restaurant food
Away from home food	Kikil (boiled meat), beef	1121121	Restaurant food
Away from home food	Tibs, fried, beef, normal	1121122	Restaurant food
Away from home food	Aresto, Shekla, Zilzil, beef, special	1121123	Restaurant food
Away from home food	Kitfo	1121124	Restaurant food
Away from home food	Raw meat, beef	1121125	Restaurant food
Away from home food	Doro (chicken) wot	1121126	Restaurant food
Away from home food	Fried chicken / Aresto	1121127	Restaurant food
Away from home food	Keywot/ Kikil (camel)	1121128	Restaurant food
Away from home food	Gomen be siga	1121129	Restaurant food
Away from home food	Kik wot (pulses split sauce)	1121130	Restaurant food
Away from home food	Beyaynetu (Fasting meal) without fish	1121131	Restaurant food
Away from home food	Beyaynetu (Fasting meal) with fish	1121132	Restaurant food
Away from home food	Tegamino/ Bozena shiro	1121133	Restaurant food
Away from home food	Fish cotelet / goulash & vegetable	1121134	Restaurant food
Away from home food	Raw vegetable (Lettuce) & bread	1121135	Restaurant food
Away from home food	Rice	1121136	Restaurant food
Away from home food	Tihilo made of roasted barley flour	1121137	Restaurant food
Away from home food	Dinich be-siga	1121138	Restaurant food
Away from home food	Qocho & cheese/ milk / yoghurt	1121139	Restaurant food

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Away from home food	Spaghetti	1121140	Restaurant food
Away from home food	Macaroni	1121141	Restaurant food
Away from home food	Pasta alfurno, lazagna or pastina	1121142	Restaurant food
Away from home food	Injera / bread with Siljo, Hilbet or Ha	1121143	Restaurant food
Away from home food	Soup, animal / plant origin	1121144	Restaurant food
Away from home food	Others N.E.C.	1121198	Restaurant food
Away from home food	Tea leaves	1201101	Beverages
Away from home food	Mekmoko (use for tea)	1201102	Beverages
Away from home food	Coffee beans	1201103	Beverages
Away from home food	Coffee ground	1201104	Beverages
Away from home food	Coffee whole (shelled)	1201105	Beverages
Away from home food	Coffee, fresh (green)	1201106	Beverages
Away from home food	Coffee granules	1201107	Beverages
Away from home food	Coffee seed shell (Seed jacket)	1201108	Beverages
Away from home food	Coffee leaves (Quti)	1201109	Beverages
Away from home food	Hops (Buck-thorn leaves)	1201110	Beverages
Away from home food	Mineral water	1202101	Spring/ Mineral Water
Away from home food	Spring water	1202102	Spring/ Mineral Water
Away from home food	Coca Cola family.	1202201	Soft drinks
Away from home food	Pepsi family	1202202	Soft drinks
Away from home food	Packed soft drinks / non coca cola & pep	1202203	Soft drinks
Away from home food	Vimto & Kineto	1202204	Soft drinks
Away from home food	Sofi Harer	1202205	Non-Alcoholic beer
Away from home food	Bukri, Karibo, Mewded (Homemade)	1202206	Non-Alcoholic beer

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Away from home food	Tonic	1202207	Soft drinks
Away from home food	Cola, Joly juice, super dip, powder	1202208	Soft drinks
Away from home food	Others N.E.C.	1202298	Soft drinks
Away from home food	Papaya/ Guava/ Orange packed	1202301	Packed fruit
Away from home food	Mango packed	1202302	Packed fruit
Away from home food	Fresh juice (any type)	1202303	other fruit
Away from home food	Powder/fruit flour/ juice	1202304	Packed fruit
Away from home food	Beso/ Fenugreek juice	1202305	Other cereals
Away from home food	Honey juice	1202306	Honey
Away from home food	Coffee, boiled	1221201	Beverages
Away from home food	Tea, boiled	1221202	Beverages
Away from home food	Milk, milk with tea/ coffee, boiled	1221203	Beverages
Away from home food	Macchiato/ cappuccino boiled	1221204	Beverages
Away from home food	Spring water	1221205	Spring/ Mineral Water
Away from home food	Soft drinks	1221206	Soft drinks
Away from home food	Juice	1221207	Packed fruits
Away from home food	Spirit		Factory processed Alcohols
Away from home food	Cognac - Local		Factory processed Alcohols
Away from home food	Gin - Local		Factory processed Alcohols
Away from home food	Gin - Imported		Factory processed Alcohol
Away from home food	Whisky		Factory processed Alcohol
Away from home food	Others N.E.C.		Factory processed Alcohol
Away from home food	Wine, local standard		Factory processed Alcohol
Away from home food	Draft Beer		Factory processed Alcohol

Category	Item	ITEM CODE (COICOP)	Categories for the Analysis
Away from home food	Beer, bottled		Factory processed Alcohol
Away from home food	Katikala, homemade Spirit		Homemade alcohol
Away from home food	Mead (honey wine)		Homemade alcohol
Away from home food	Tella, refined		Homemade alcohol
Away from home food	Tella, unrefined		Homemade alcohol
Away from home food	Spirit, local		Homemade alcohol
Away from home food	Gin, local		Factory processed Alcohol
Away from home food	Whisky/ Gin, imported		Factory processed Alcohol
Away from home food	Wine, local/export standard		Factory processed Alcohol
Away from home food	Beer and Draft		Factory processed Alcohol
Away from home food	Katikalla-Homemade sprit		Homemade alcohol
Away from home food	Mead/ Honey wine		Homemade alcohol
Away from home food	Tella		Homemade alcohol

ANNEX II: LETTERS OF APPROVAL TO USE SECONDARY DATA

ETHIOPIAN STATISTICS SERVICE

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ETHIOPIAN STATISTICS SERVICE

ቀን/Date 08 SEP 2022

ቁጥር/Ref. No. M Val - 1/448

Dear Tsegazeab Bezabih,
Addis Ababa

This is referring to the letter you submitted to our office requesting permission to use the Household Consumption Expenditure Surveys (HCES) and Welfare monitoring Surveys (WMS) conducted in 2000, 2005, 2011, and 2016 for your PhD study dissertation at University of South Africa.

We hereby have dully authorized you to use the aforementioned datasets collected by Ethiopian Statistics Service (formerly known as Central Statistics Agency) to conduct your study on the topic "THE NUTRITION TRANSITION IN URBAN ETHIOPIA DURING RAPID ECONOMIC GROWTH (2000-2016)"

If there are any questions regarding the survey dataset, feel free to contact my office.

የኢትዮጵያ ስታቲስቲክስ አገልግሎት
Ethiopian Statistics Service

Sincerely,

Amare Legesse
Statistical Surveys & Censuses Deputy Director General

ስልክ፡- +251 111 56 42 26
+251 111 56 84 65
ፋክስ፡- +251 111 11 54 70

Beyond Providing Data

ድረ-ገፅ፡- www.statsethiopia.gov.et
ፖ.ሳ.ቁ፡- 1143

Feb 21, 2022

Tsegazeab Bezabih
WFP
Ethiopia
Request Date: 02/20/2022

Dear Tsegazeab Bezabih:

This is to confirm that you are approved to use the following Survey Datasets for your registered research paper titled: "Nutrition transition in Urban Ethiopia":

Ethiopia

To access the datasets, please login at: https://www.dhsprogram.com/data/dataset_admin/login_main.cfm. The user name is the registered email address, and the password is the one selected during registration.

The IRB-approved procedures for DHS public-use datasets do not in any way allow respondents, households, or sample communities to be identified. There are no names of individuals or household addresses in the data files. The geographic identifiers only go down to the regional level (where regions are typically very large geographical areas encompassing several states/provinces). Each enumeration area (Primary Sampling Unit) has a PSU number in the data file, but the PSU numbers do not have any labels to indicate their names or locations. In surveys that collect GIS coordinates in the field, the coordinates are only for the enumeration area (EA) as a whole, and not for individual households, and the measured coordinates are randomly displaced within a large geographic area so that specific enumeration areas cannot be identified.

The DHS Data may be used only for the purpose of statistical reporting and analysis, and only for your registered research. To use the data for another purpose, a new research project must be registered. All DHS data should be treated as confidential, and no effort should be made to identify any household or individual respondent interviewed in the survey. Also, be aware that re-distribution of any DHS micro-level data, either directly or within any tool/dashboard, is not permitted. Please reference the complete terms of use at: https://dhsprogram.com/Data/terms-of-use.cfm.

The data must not be passed on to other researchers without the written consent of DHS. However, if you have coresearchers registered in your account for this research paper, you are authorized to share the data with them. All data users are required to submit an electronic copy (pdf) of any reports/publications resulting from using the DHS data files to: references@dhsprogram.com.

Sincerely,

Bridgette Wellington

Bridgette Wellington
Data Archivist
The Demographic and Health Surveys (DHS) Program

530 Gaither Road, Suite 500, Rockville, MD 20850 USA +1.301.407.6500 +1.301.407.6501 fax icf.com

ANNEX III: DATA COLLECTION TOOL

THE NUTRITION TRANSITION IN URBAN ETHIOPIA DURING RAPID ECONOMIC GROWTH (2000-2016)

FGD Schedule

Town/City_____________ Study Group____
Study Age Group_Income Category. Number of participants. _________
Moderator______Venue__
Date____Starting time____Ending time._____

Consent Form
Participant information sheet
Consent to participate in the study.

Participants' demographic profile				
	Participant code	**Age**	**Education**	**Current job**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

The first topic I would like us to discuss is the typical daily food consumption habits of people in this area. Please note that for this first question, I am asking about the typical daily diets of households in their homes.

1.1 What kinds of food do people in your community commonly consume?
Probe (a) How does the typical daily diet differ by age group?
Probe (b) How does the typical daily diet differ by type of occupation?
Probe (c) How does the typical daily diet differ by level of income?
Probe (d) How does the typical daily diet differ by gender?
Probe (e) How does the typical daily diet differ by employment status?

1.2 What was the typical Ethiopian traditional daily diets?
Probe (a) Do you think people still prefer these?
Probe (b) Compared with modern day daily diets, how healthy was traditional Ethiopian daily diets?

1.3 I am going to show you a sheet of groups of foodstuffs and then ask you some questions.

Use a handout or a flipchart showing the following food groups (names and pictures) Wholegrains (teff, maize, pulses, homemade foods, etc) Refined cereals (rice, factory processed wheat flour, pasta, shop-bought processed bread) Butter and oil Sugar and sugar-sweetened beverages, sweets, and cookies Fast foods and processed foods Fruits and vegetables Animal source foods

Probe (a) Looking at these groups of foods, tell me how the inclusion of these in typical daily diets have changed over the last 10 years?
Probe (b) And over the last 5 years?

My second topic is about food consumption patterns when people are away from home. (Here define with what you mean with "away from home")

2.1 What types of foods do you normally eat away from home?

2.2 I am going to show you a sheet of groups of foodstuffs and then ask you some questions Use a handout as a prompt sheet or a flipboard showing the following food groups:

Street/market vendors Fast food restaurant Cafeteria Butchery houses Sit-in restaurants

Probe (a) How has the typical consumption of these groups of foods consumed away from home changed over the past 10 years?
Probe (b) And in the past 5 years?

My third topic is about the (a) availability (referring to the existence of the food in the local market), (b) the accessibility (geographic accessibility, which is determined by how easily the participants can physically reach the service.) and (c) the affordability (related to the ability and willingness of the participants to pay for the food).

3.1 Thinking of canned (or tinned) foods, sausages, juice drinks, soft drinks, cookies, pizzas, and burgers → how have the availability of these foods changed in the last 10 years?
Probe (a) And their accessibility in terms of availability in shops, markets, and convenience?
Probe (b) And their affordability?
Probe (c) And the availability, accessibility and affordability of fresh fruits and vegetables – how have these changed in the last 10 years?

My fourth topic is about food choice and food autonomy.

4.1 Tell me about your own ability (autonomy) to control the types of food you eat at home.

Probe (a) How do you choose the food you eat?
Probe (b) How important is price or affordability for you in your daily food choices?

Probe (c) How important is personal taste or preference for you in your daily food choices? Do your personal preferences ever clash with your household's/family's food choices?
Probe (d) How important is health and nutritional benefits for you in your daily food choices?
Probe (e) How important is convenience for you in your daily food choices?
Probe (f) If you had to choose affordability, taste/preference, health/nutrition, or convenience – which one of these influences your daily food choices the most?

My fifth and final topic is about physical activity and lifestyle.

5.1 How many hours a day in a typical week do you devote to physical activities? (Explain that this includes walking, jogging, walking the dog, going to the gym, taking part in organised sports, gardening, swimming, dancing).
5.2 Is your ability to exercise regularly affected by your disposable income?
5.3 How has the physical activities of people changed in the city over the past ten years?
5.4 How many hours in a day in a typical week do you spend sitting down? (At the computer, laptop, desk, television)
Probe (a) Do you eat snacks while sitting down?
5.5 How are health outcomes linked to diets and physical activities?
5.6 Is obesity a problem in this community? Why do you say so?
5.5 Have perceptions of obesity changed in the last years? How?

Would you like to add something before we finish the interview?

Thank you!

ANNEX IV: APPROVAL LETTER OF RESEARCH ETHICS REVIEW COMMITTEE

UNISA university of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

29 August 2022

Dear Mr Tsegazeab Bezabih Woldeyohannes

NHREC Registration # :
Rec-240816-052
CREC Reference # :
64046265_CREC_CHS_2022

Decision:
Ethics Approval from 29 August 2022 to 29 August 2023

Researcher(s): Name: Mr TB Woldenyohannes
Contact details: 64046265@mylife.unisa.ac.za
Supervisor(s): Name: Prof G E du Plessis
Contact details: Dplesge@unisa.ac.za

Title: THE NUTRITION TRANSITION IN URBAN ETHIOPIA DURING RAPID ECONOMIC GROWTH (2000-2016)
Degree Purpose: PhD

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for one year.

The ***low risk application*** *was reviewed by* College of Human Sciences Research Ethics Committee, in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date **(29 August 2023).** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **64046265_CREC_CHS_2022** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature: Khan

Prof. KB Khan
CHS Research Ethics Committee Chairperson
Email: khankb@unisa.ac.za
Tel: (012) 429 8210

Signature: PP AHM udesi

Prof. ZZ Nkosi
Acting-Exécutive Dean: CHS
E-mail: nkosizz@unisa.ac.za
Tel: 012 429 6758