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Transitioning to Nutrition-Sensitive Food Environments in Ghana

Triple Sector Strategies to Reduce the Triple Burden of Malnutrition

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Abstract

The triple burden of malnutrition is growing in low- and middle-income countries (LMICs). Increasing access to affordable ultra-processed foods in the food environment is contributing to this problem. While existing explanations for this triple burden of malnutrition have examined demand-side factors of food choices, the supply-side policies relating to the food environment drivers, ideas and actors' interests have been neglected. Using a case study of Ghana, this analysis combines the Advocacy Coalition Framework with the narrative policy analysis to unpack the supply-side food environment policies and actors driving the triple burden of malnutrition. Applying a mixed methods analysis of the transcripts, the narratives reveal public, private and civil society organization (CSO) coalitions with different ideas and interests in the food environment. In the private sector coalition, food companies engage in aggressive advertising and are driven by profit motives – leading to the supply of more ultra-processed foods. The public sector is failing to regulate the market because of inadequate policies, limited institutional capacities and coordination, enforcement challenges, inadequate resources, and self-interest. Social activism by CSOs, for example, pressuring food companies to deliver healthy foods and holding the government accountable, is also lacking. The result is a triple sector (public, private and CSO) failure in the urban food environment with consequences on the availability of ultra-processed foods. This has long-lasting implications for the reduction of the triple burden of malnutrition and the achievement of zero hunger. To accelerate nutrition-sensitive food environments that deliver healthier food options, we argue that it is critical to entertain the ideas and interests of stakeholders and implement food environment policies that cover private and public sector initiatives, as well as increase consumer awareness.

Keywords: Malnutrition; ultra-processed food; nutrition-sensitive; political economy; food environment; Ghana

JEL Codes: Q13, Q18

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1. Introduction

The triple burden of malnutrition, defined as coexistence of overnutrition, undernutrition and micronutrient deficiencies is a growing public health concern globally (Ameye & Swinnen, 2019), and particularly in low- and middle-income countries (Gómez et al., 2013; Meenakshi, 2016; Pinstrup-Andersen, 2007). High rates of non-communicable diseases (NCDs) have tremendous consequences for recovering from pandemics like COVID-19 due to weak immune systems from poor nutrition, contributing to pre-existing conditions and increasing the number of vulnerable groups in society (see WHO/UNDP, 2020). Poor nutrition is also a reflection of the food environment – which is changing rapidly due to urbanization, supermarketization, intra-regional trade, e-commerce and increasing incomes in developing countries (Ameye & Swinnen, 2019; Fox et al., 2019). These transitions in most food environments are increasing the availability of and access to affordable, ultra-processed food products,[1] such as energy-dense foods and excessively sugary beverages (see Reardon et al., 2019). The increased availability of and access to ultra-processed food options relative to other healthy food products constrains consumer food choices in low- and middle-income countries (LMICs). The current trend of increasing ultra-processed food consumption in LMICs raises a fundamental concern relating to food choices (demand side) in developing economies where food prices and income play a critical role in determining the food basket.

Demand-side explanations relating to food choices have gained increased attention in the behavioral economics literature (see Heshmat, 2011; Just, 2011; Lappalainen & Epstein, 1990), although limited attention has been paid to ultra-processed food (See Karnani et al., 2016). In this array of literature, behavioral changes have been conceptualized through the lens of rational choice theory (Vermeulen et al., 2020). The rational choice theory postulates that a consumer has relevant knowledge of the food environment and, therefore, when faced with options, will act rationally by choosing the option that maximizes utility or benefits (Scott, 2000; Simon, 1955). This explanation has some limitations, as consumers do not always act in a "rational" way as implied by classical economic models. In particular, food choices are influenced by a combination of cultural, preference, economic and cognitive processes, including supply-side factors relating to the food environment and policy landscape (Herforth & Ahmed, 2015; Vermeulen et al., 2019). However, the food environment – the often hidden middle link between food production and household consumption that precariously ensures

[1] "Ultra-processed food products are formulations of several ingredients that, besides salt, sugar, oils and fats, include food substances not used in culinary preparations, in particular, flavors, colors, sweeteners, emulsifiers and other additives used to imitate sensorial qualities of unprocessed or minimally processed foods and their culinary preparations or to disguise undesirable qualities of the final product" (Gibney, 2019, p. 3). NOVA provides a four-group classification of food based on the level of processing: Group 1 (unprocessed or minimally processed foods), Group 2 (processed culinary ingredients), Group 3 (processed foods), and Group 4 (ultra-processed food and drink products). Unprocessed (or natural) foods are edible parts of plants (seeds, fruits, leaves, stems, roots), animals (muscle, offal, eggs, milk), fungi, algae and water, after separation from nature. Ultra-processed foods are often branded, convenient (durable, ready to consume), attractive (hyper-palatable) and highly profitable (low-cost ingredients) food products (see Gibney, 2019 and https://world.openfoodfacts.org/nova).

food and nutrition security – has received limited attention. This domain refers to the physical, economic, social, political and cultural factors that influence accessibility, availability and affordability of food in a region or community (see e.g., Herforth & Ahmed, 2015; Swinburn et al., 2013; Turner et al., 2018). The food environment plays a fundamental role in nutrition because it constrains or expands food choices and signals to consumers what to purchase (Herforth & Ahmed, 2015).

The current food environments in most developing economies, which are characterized by the increasing availability of ultra-processed foods relative to healthy foods, are considered food deserts. Food deserts are defined as geographic areas with limited access to fresh and affordable healthy foods (see Ver Ploeg et al., 2009; Wright et al., 2016). In food deserts, ultra-processed foods are available in both formal markets (e.g., small shops and supermarkets) and informal markets (e.g., traditional markets, street food vendors and fast-food chains) (see Asfaw, 2008; Reardon et al., 2021). In such food desert environments, consumers may exhibit intertemporal preferences and bounded rationality (Carrera, 2014; Jolls et al., 1998). This contributes to decisions that lead to suboptimal outcomes, such as purchasing ultra-processed foods that are convenient, accessible, affordable and predominantly available in the food environment (see Mockshell et al., 2019; Reardon et al., 2019). This increasing exposure of populations to food desert environments is linked with increasing rates of stunting, wasting, being overweight, obesity, and the associated diet-related NCDs, such as cardiovascular diseases, diabetes and certain cancers (James et al., 2004).

In a well-functioning market, resources will be allocated optimally. However, due to externalities, the food environment in many LMICs has not yet adjusted to reverse the growing trend in NCDs, obesity, wasting and stunting. The current food-retail market is far from delivering optimal societal outcomes, and questions of why consumers still opt for ultra-processed foods continues to raise concerns. These concerns reflect a long-standing challenge, and despite the growing literature on consumer food choices, there remains a limited understanding of the root causes (e.g., power dynamics and information asymmetry) and the drivers (interests, incentives and ideas) of this prevailing problem and influence on the triple burden of malnutrition. Existing research has examined the concept of the food environment and actions taken by governments to improve the food environment (see, e.g., Laar et al., 2020; Turner et al., 2018). Ameye and Swinnen (2019) examined the changing trends and global relationship between obesity, income and gender (see Fox et al., 2019). The application of GIS mapping to plan market infrastructure and improve access to food outlets has featured in the literature as well (Ohri-Vachaspati & Leviton, 2010). However, empirical analysis unpacking the supply-side policies that influence the food environment and contributions to the triple burden of malnutrition in LMICs using a political economy approach is very limited.

Building on recent work on urban and informal food environments (see Resnick et al., 2019), food deserts versus food oases, retail diversity, nutrition-sensitive value chains (Allen & de Brauw, 2018) and food market inventory (Andam et al., 2018), this study aims to reveal the narratives, ideas and interests in the food environment – with implications on the triple burden of malnutrition in a developing economy context. Thus, the study contributes to the empirical analysis of the food environment, by generating additional evidence to complement the dominant consumer food choice analysis via a political economy lens to unpack the actors' landscape and unravel the narratives, interests and ideas of the actors. Such analysis has been missing in explanations for the prevalence of the triple burden of malnutrition, thus, limiting policy instrument bundles in solving the root problems of increasing access to affordable, ultra-processed foods in the food environment. The remainder of this paper is structured as follows. The next section outlines the linkages between the food environments, the triple burden of malnutrition and governance challenges. Section 3 describes the analytical framework and mixed research methods used in this study. The results are presented in Section 4 and discussed in Section 5. Finally, conclusions are drawn in Section 6.

2. Food environment, the triple burden of malnutrition and governance challenges

This section reviews the literature on the linkages between food environments, the triple burden of malnutrition and governance challenges.

2.1 Ghana's Urban Food environment

Ghana's population is growing at an annual rate of 2.2% and experiencing urbanization at a rate of 3.3% (see UNDESA, 2018; 2019). With increasing urbanization accompanied by the rising middle class and changing lifestyles (Ameye & Swinnen, 2019), the food environment is transitioning to accommodate the demand for easy-to-prepare, highly processed foods and convenience foods (Fox et al., 2019). This food environment transition is evident in the urban consumer food basket and trends in the food retail system (Ghana Statistical Service, 2012). A mix of informal (open-air markets, roadside stalls and shops, and hawkers) and formal (supermarkets, mini marts) food outlets characterizes the food retail system (Dake et al., 2016; Meng et al., 2014). Informal or traditional food retail outlets dominate food retail outlets – playing an important role in the food environment (Meng et al., 2014). In urban areas in Ghana, the agri-food environment is experiencing a rapid increase in supermarket retail outlets, convenience stores and fast-food restaurants (Andam et al., 2018). Andam et al. (2018) show that the number of supermarkets in the country has increased from three before 2005 to about 16 in 2010, with many more coming up. These supermarkets sell a wide range of food products, including fresh and frozen meats, bread, fresh and processed fruits and vegetables, sugar-sweetened beverages as well as ready-to-eat foods, such as pizza, burgers, potato chips, etc. (Meng et al., 2014).

Supermarketization in urban settings presents both challenges and opportunities relating to access to affordable diets. With efficiency and economies of scale, supermarkets offer the opportunity to improve consumers' access to affordable food and ensure food safety (Hawkes, 2008; Qaim, 2017; FAO et al., 2020; Khonje et al., 2020). In contrast, supermarkets could also increase access to unhealthy foods by offering more energy-dense processed (ultra-processed) foods, which are often non-perishable with minimal nutritional value – rich in fat, sugars and salt. This is evident in other developing economies – where besides nutrient intake, supermarkets alter consumption behaviors by shifting dietary composition from unprocessed foods toward ultra-processed foods (Asfaw, 2008; Popkin & Reardon, 2018; Khonje et al., 2020). Recent evidence on the sources of processed food products in Ghana shows that imports dominate processed foods in retail outlets (Andam et al., 2018). An inventory assessment by Andam et al. (2018) shows that imports account for about 63% of processed food products in food retail markets in Accra. The same study reveals that processed food products are not limited to supermarkets but can also be found in traditional retail outlets (Andam et al., 2018). Given that the majority of urban consumers purchase food from the traditional retail outlets (Tuholske et al., 2020), the proliferation of processed food

products in these markets represents a major source of concern due to the negative impact they have on consumers' health. For example, a study conducted in poor neighborhoods of Accra shows a positive association between purchasing food from convenience stores and individual Body Mass Index (BMI), implying that access to convenience stores increases the risk of obesity (Dake et al., 2016). Fox et al. (2019) concur, finding that global increases in being overweight/obesity appear to be driven more by domestic processes, including economic development and urbanization. This raises serious concerns given the indications that NCDs cause about 30%-34% of deaths and disability-adjusted life years in Ghana (Ministry of Health, 2012).

2.2 Prevalence of the triple burden of malnutrition

Along with dietary changes in Ghana, diet-related diseases are also on the rise (see Ofori-Asenso et al., 2016), although the nutritional status of children has generally improved since 2006 compared with adults, as illustrated in Figure 1. The prevalence of anemia in the general population is very high, especially among children who are under the age of five (see Figure 1). In 2016, about two-thirds of children (66.9%) in Ghana were anemic, while 45.7% of women aged 15-49 had anemia. More than half of pregnant women (54.3%) were anemic (Figure 1). The share of the population that is undernourished declined about 28.9% between 2006 (8.3%) and 2016 (5.9%) (see Figure 1). In the past three years, there has not been a significant reduction in the rates of undernourishment. The percentage of children with a low height for their age (stunting), which is a sign of chronic malnutrition declined from 27.9% in 2006 to 18.8% in 2014. In 2014, 11.2% of Ghanaian children were underweight (see the notes below Figure 1). Wasting, which is an indication of acute malnutrition and often a consequence of insufficient food intake, is less common than stunting and being underweight.

The prevalence of overweight children has almost remained the same in the past decade, although it increased sharply from 2.6% in 2006 to 5.7% in 2008 but returned to 2.6% in subsequent years. The share of overweight adults has increased in the past decade – increasing from 25.8% in 2006 to 32% in 2016 (an increase of about 24%). The prevalence of overweight and obese adult women is higher than that of adult men over the years as illustrated in Figure 1 (see Ameye & Swinnen, 2019). Among women, 33.8% were overweight or obese in 2006, and the rate has been increasing over the years reaching 41% in 2016, while it increased from 17.1 to 22.1% in the same period among men. The high share of overweight adults is linked to the increasing incidence of diet-related diseases, such as hypertension, diabetes and cardiovascular diseases. The 2014 Ghana Demographic and Health Survey (GDHS) shows that the prevalence of hypertension ranges from 1.8% among women and 2.6% among men aged 15-19 years to 38.3% and 24.3% among women and men aged 45-49 years, respectively (Ghana Statistical Service et al., 2015). This indicates that the prevalence of hypertension increases with age. As expected, the prevalence of hypertension is higher among urban residents (15.8% of women and men) compared with rural dwellers (9.5% of

women and 8.8% of men) and respondents who are obese (26.6% of women and 50.9% of men). Information on diabetes prevalence among the adult population is scant. However, in 2010, 4.3% of the population (ages 20 to 79) was diabetic (see notes below Figure 1). With the increasing availability and consumption of sugar-rich, nutrient-poor and ultra-processed foods, as a result of the liberalization of food trade (Stevano et al., 2020) as described in sub-Section 2.1, the increase in overweight/obese adults could be a reflection of the current food environment and existing governance challenges (See Fox et al., 2019).

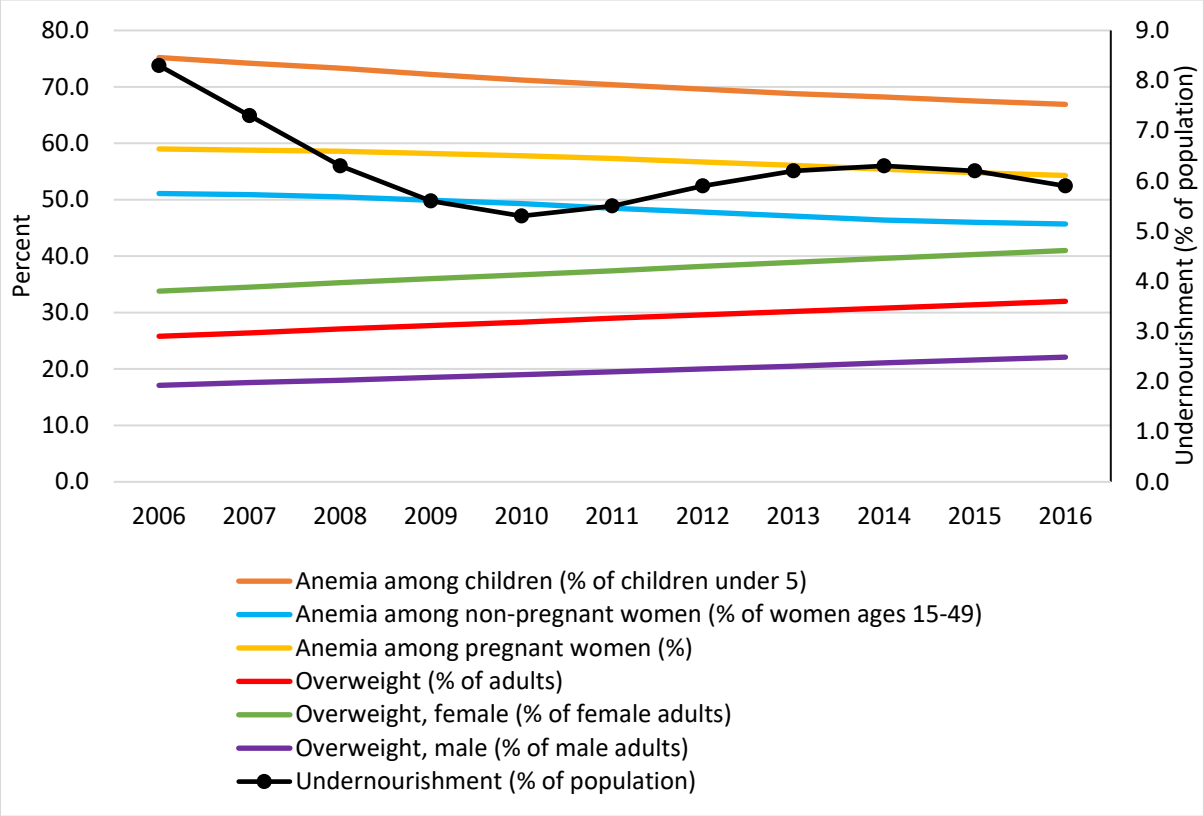

Figure 1: Trends in the prevalence of malnutrition in Ghana (2006-2016)

Notes: Diabetes prevalence (% of population aged 20 to 79): 4.3% in 2010. Stunting or height for age (% of children under 5): 27.9%, 28.4%, 22.8%, 22.8% and 18.8% for 2006, 2008, 2011, 2012 and 2014, respectively. Underweight or weight for age (% of children under 5): 13.9%, 14.4%, 13.4% and 11.2% for 2006, 2008, 2011 and 2014, respectively. Severe wasting or weight for height (% of children under 5): 1.8%, 2.4%. 1.4% and 0.7% for 2006, 2008, 2011 and 2014, respectively. Overweight (% of children under 5): 2.6%, 5.7% 2.6%, 2.6% and 2.6% for 2006, 2008, 2011 and 2012, respectively.

Data source: World Bank (2020a) and FAO et al. (2020)

2.3 Governance challenges of the food environment

The prevalence of malnutrition is a multifaceted problem and spans multiple sectors (including health, agriculture, education, gender, water and sanitation) and policies. Addressing chronic malnutrition requires a corresponding multidisciplinary and multi-sectoral governance response that is lacking in developing economies. Gillespie (2013) refers to governance as the capacity to act, the power to act and the commitment to act, which

requires accountability, responsiveness and transparency. Such governance mechanisms in a country are critical in providing an adequate environment to achieve food and nutrition security and economic growth (Gillespie, 2013; Ogunniyi et al., 2020). Gillespie et al. (2019) highlight that nutrition interventions and programs cannot be successful without the political commitment and active support of many actors. A strong focus on governance involving coordinated actions by many actors across sectors and levels of government, accountability, and citizen participation in intervention programs is necessary to reduce the prevalence of the triple burden of malnutrition.

Recent evidence in Sub-Saharan Africa shows that governance indicators, such as control of corruption, government effectiveness and political stability scores, increase both food and nutrition security, with control of corruption having the largest impact (Ogunniyi et al., 2020). Based on selected World Bank governance indicators for Ghana, there have not been major improvements in most of the governance indicators over the years as illustrated in Figure 2. Apart from voice and accountability, indicators, such as government effectiveness, regulatory quality and control of corruption, which are crucial for improving nutrition, are negative, suggesting moderately weak governance structures.

The weak government effectiveness, regulatory quality and control of corruption at the national level may also translate to political commitment, leadership and the ability to formulate and implement policies and nutrition-sensitive programs as well as regulate unhealthy food environments. The cyclical change of governments almost every eight years in Ghana may have led to shifts in political commitments, affecting the sustainability, fight against malnutrition, understanding and knowledge of nutrition programs (see Ghartey, 2010; Ministry of Health, 2013). The voice and accountability scores show moderately strong governance, indicating that citizens can participate in selecting their government, are free to express their opinions, join any groupings, and enjoy free media. This offers a strong indication to encourage the participation of multi-stakeholders (including CSOs, the media, the private sector and citizens) in the nutrition policy process. The weak regulatory mechanisms may be partly responsible for the proliferation of unhealthy food products in the various food retail markets in Ghana with implications for the prevalence of the triple burden of malnutrition (Figure 2). The rising rate of the triple burden of malnutrition, particularly the increasing incidence of being overweight and obesity and related NCDs in Ghana could possibly be linked to the weak governance systems.

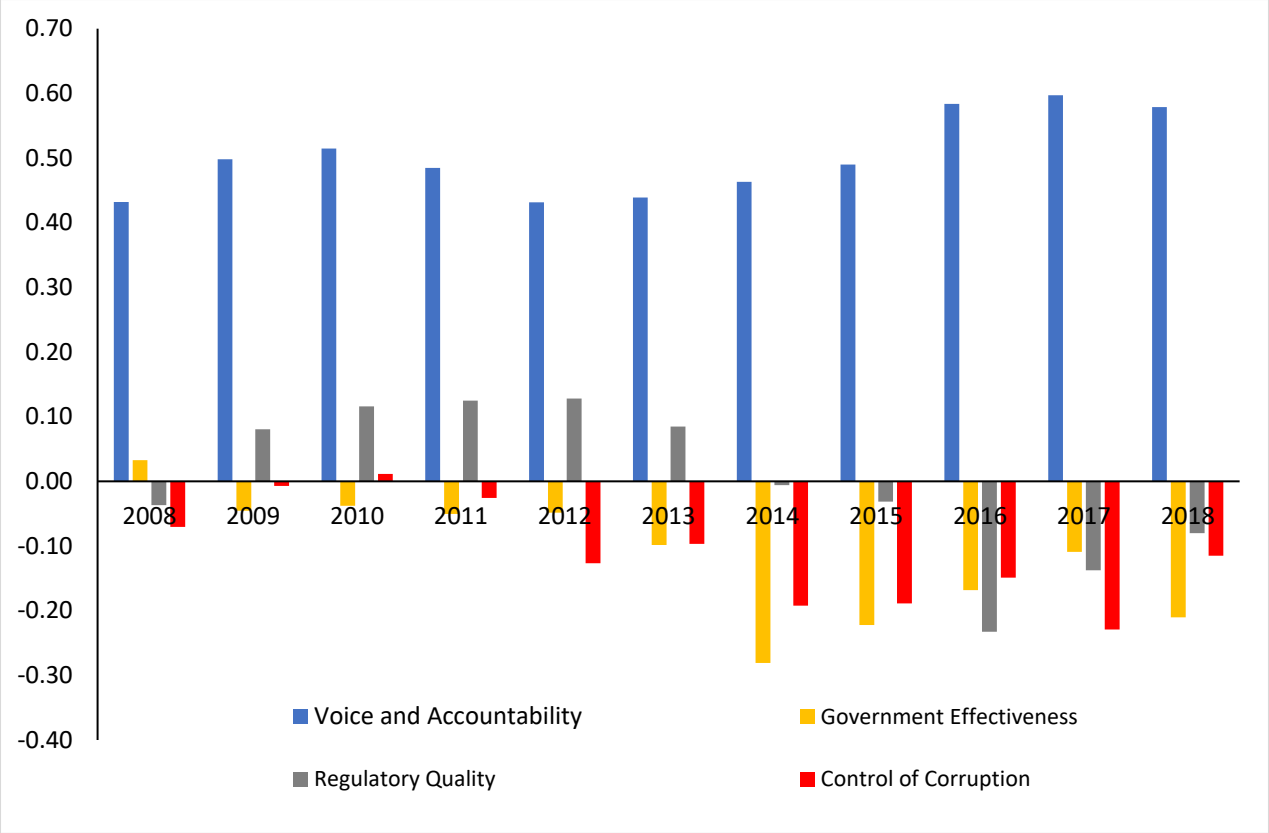

Figure 2: World Bank governance indicators for Ghana
Data source: World Bank (2020b)

This figure shows some selected world bank governance indicators for Ghana, which are crucial for ensuring a healthy food environment (i.e., voice and accountability, government effectiveness, regulatory quality and control of corruption). This figure shows negative indicator scores for government effectiveness, regulatory quality and control of corruption, especially in recent years, implying the presence of moderately weak governance structures in the country.

3. Research methods

This section describes the conceptual framework used for this study, followed by an explanation of the empirical research methods that were applied.

3.1 Conceptual framework

This study combines the Advocacy Coalition Framework (ACF) developed by Sabatier and Jenkins-Smith (Jenkins-Smith & Sabatier, 1994; Weible & Sabatier, 2017) with narrative policy analysis (Roe, 1994) to identify the discourse coalitions. The ACF is used to identify policy subsystems of a number of advocacy coalitions consisting of different actors who share a set of ideas and policy beliefs (Jenkins-Smith & Sabatier, 1994). The ACF policy subsystem is a central unit of analysis for conducting a stakeholder analysis. A policy subsystem is defined as a field of policy analysis comprising a set of stakeholders from government officials, private sector, interest groups, researchers, civil society organizations, among others who actively engage with a policy issue or problem (Jenkins-Smith & Sabatier, 1994; Weible et al., 2009). Actors within the policy subsystem are grouped into advocacy coalitions, with each coalition sharing a set of normative and causal beliefs (Jenkins-Smith & Sabatier, 1994). In the ACF, the concept of policy beliefs is fundamental because forming a coalition depends on shared ideas and policy beliefs. Policy beliefs are implicit theories about how to achieve a certain objective. They involve views on the effectiveness of policy instruments, value priorities, perceptions of important causal relationships and perceptions of world states (Jenkins-Smith & Sabatier, 1994; Majone, 1980).

Despite the usefulness of the ACF identifying and analyzing the role of policy beliefs in the policy process, the framework underspecifies specific facets of the policy process, such as how language is used to express policy beliefs and how the use of language, specifically the narrative structure, may contribute to the change in policy beliefs and policy learning. Combining the AFC with the narrative policy analysis framework that illuminates specific facets of the policy process underspecified by the ACF is relevant for unraveling the policy subsystem. As Shanahan et al. (2011, p. 536) note, “Stakeholders use words, images, and symbols to strategically craft policy narratives to resonate with the public, relevant stakeholders, and governmental decision makers, with the aim of producing a winning coalition”.

There are different approaches to analyzing narratives, which are grouped into two categories: structural approach and post-structural approach (Jones & McBeth, 2010). The structural approach uses quantitative methods to analyze narratives, whereas the post-structural approach employs qualitative methods and focuses on developing and assigning meaning to objects and processes (Jones & McBeth, 2010). The application of ACF in tandem with narrative policy analysis is also unique and contributes to the political economy

perspective to unpacking food environment policy subsystem and generating evidence-based policy for nudging the food environment to deliver healthy diet options in developing economies.

3.2 Data collection and analysis

The study focused on the urban food environment due to the influx of ultra-processed foods, rapid urbanization and increasing incidence of NCDs. In the context of this study, we focused on the NOVA fourth food category (ultra-processed food and drink products) (Monteiro et. al., 2018). This includes sugar-sweetened soft drinks, sweet or savory packaged snacks, reconstituted meat products and pre-prepared frozen dishes, derived from foods and additives, and has little if any intact Group 1 (unprocessed (or natural) foods)[2] or Group 3 (processed)[3] foods.

To examine the underlying narratives of the food environment actors, we used Yanow's (2000, p. 26-39) approach of "accessing local knowledge" by combining in-depth interviews and policy document analysis. The actors involved in agriculture and food policy, health, nutrition, media, CSO and food industry sectors were identified through a stakeholder map and expert interviews. The interviewees were selected through purposive and snowball sampling techniques. Additional respondents were identified based on the qualitative research principle of "completeness" (covering the broad spectrum of actors) and "dissimilarity" (respondents with diverse perspectives) (Blee & Taylor, 2002). Data and respondent triangulation were employed to check internal validity and to select additional respondents (Golafshani, 2003; Guion et al., 2011).

The in-depth interviews with food environment stakeholders were conducted using a semi-structured interview approach comprising broad initial questions. The questions were framed around: (1) Who are the main actors (institutions) in the food environment policy subsystem? (2) What are the ideas, incentives and interests of the actors (institutions) in the food environment policy subsystem? (3) What are the challenges of regulating the ultra-processed foods and providing healthy food options in the food environment? (4) What are the policy strategies for transforming the food environment into a healthy one? A total of 22 stakeholders were interviewed for a duration of 1-2 hours. These stakeholders belong to the broad categories of public sector, CSOs and the private sector (see Table 1). The public sector actors comprise policy actors from government ministries and agencies, academia and parliamentarians. In-depth interviews with the actors were recorded with participant consent and transcribed for the analysis. The transcripts were uploaded into NVivo 12 software for analysis. The original texts were coded and storylines were identified. Additional codes were

[2] Edible parts of plants (seeds, fruits, leaves, stems, roots) or of animals (muscle, offal, eggs, milk).

[3] Processed foods, such as bottled vegetables, canned fish, fruits in syrup, cheeses and freshly made breads. They are made essentially by adding salt, oil, sugar or other substances from Group 2 to Group 1 foods.

identified and aggregated with the initial codes into policy themes. Overall, a total of 31 policy themes were identified following the coding of the transcripts. Table A1 in the Appendix describes the policy themes in more detail. The major storylines, including specific phrases from the interviews are provided.

Table 1: Interviewed stakeholders

Type	Number
Public sector	14
Government ministries and agencies	*6*
Academia	*5*
Parliamentarians	*3*
Civil society organizations (CSOs) (national and international)	5
Private sector	3
Total	22

Note: Out of 15 private sector stakeholders, only 3 were willing to talk to the research team.
Source: In-depth interviews

Factor and cluster analysis

To perform the factor and cluster analyses, the qualitative data was transformed into quantitative data. The data transformation followed an approach developed by Mockshell and Birner (2015). Each policy theme identified from the content analysis was assigned a binary value (1= yes, if the policy theme appeared in the narrative of a respondent and 0= no, if otherwise). From the coding, a total of 31 policy themes were identified (see Table 2). Factor analysis with the principal component extraction method using the oblique rotation method was conducted. The factor analysis aims to reveal patterns in the 31 policy themes and categorize them into consistent groups (components), referred to as policy ideas. After the factor analysis, a two-step cluster analysis using both hierarchical and K-means clustering was conducted to explore how the various actors cluster around the 31 policy themes. The cluster membership was determined and cross-tabulated using an identification variable for each actor. The cluster analysis was used to identify coalitions based on the shared policy themes.

4. Results

This section presents the policy themes that emerged from factor analysis and describes the policy coalitions based on the cluster analysis. In addition, the ways in which policy actors expressed their ideas in the form of narratives are presented.

4.1 Policy themes and policy beliefs

Factor analysis was used to identify the policy beliefs as indicated in Table 2. Bartlett's test of sphericity is significant (chi-square = 3563.413; $p < 0.000$), indicating that the correlation between variables is adequate for the factor analysis. Using the Kaiser rule, all factors with eigenvalues greater than 1 were retained (see Field, 2018). Based on this rule, 10 principal components were extracted, which together explain 83% of the error variance. Factor loadings with absolute values of more than 0.30 were initially selected. Using variables with highest factor loadings rule in each component, the policy themes that emerged were labeled to reflect the variables in the component (see Table 2).

Based on the factor loadings, the main policy themes identified from the principal components are: policies and prevalence of ultra-processed food, education and awareness, limited government resources, production incentives, consumer preferences, enforcement of regulations, institutional weakness, high cost of producing healthy foods, short-term policies and profit motives, and policymakers' self-interests. Policies and prevalence of ultra-processed foods, education and awareness, and limited government resources contribute more than 10% per component of the explained variance – making them the most dominant policy themes. Social classism, weak enforcement, short term policy and weak institutions contributes a range of 6-8% per component of the explained variance – falling in the middle range of dominant policy themes. While high cost of producing healthy foods, and life style changes are the least dominant policy themes (see Table 2).

Table 2: Policy theme and policy beliefs identified by factor analysis

Variable	Policies and prevalence of ultra-processed foods	Education and awareness	Limited government resources	Production incentive	Social classism, consumer preference and affordability	Weak enforcement	Short-term policy and profit motive	Weak institution and fragmentation	High cost	Self-interest and lifestyle changes
High availability of ultra-processed foods	**0.31**	-0.09	**-0.64**	0.22	**0.31**	-0.04	**-0.42**	0.11	-0.13	0.15
High affordability of ultra-processed foods	**0.31**	0.23	-0.25	-0.01	**-0.73**	0.05	0.08	0.04	-0.01	-0.07
High accessibility of ultra-processed foods	**0.66**	**0.40**	-0.07	-0.08	-0.17	0.00	0.02	-0.26	-0.19	0.08
High cost of producing healthy diet options	-0.09	0.05	-0.18	0.00	0.12	-0.13	-0.01	-0.02	**0.90**	-0.14
Inadequate standards and regulation	0.09	-0.14	0.24	**0.58**	0.19	**0.39**	0.28	0.13	0.23	0.20
Lack of enforcement	0.05	-0.07	-0.03	0.06	-0.09	**0.93**	0.24	0.00	-0.13	-0.05
Limited resources	-0.05	-0.02	**0.77**	-0.21	-0.01	0.02	-0.09	0.12	-0.12	0.16
Policy maker (politician) self-interest	-0.20	-0.13	-0.13	**0.82**	-0.18	0.08	-0.09	-0.12	0.15	**0.34**
Influence of lobby groups	-0.19	**-0.38**	-0.21	0.11	-0.28	**-0.44**	-0.23	0.28	0.13	**0.42**
Lack of policies	**0.48**	0.23	0.16	0.00	0.07	-0.27	0.21	**0.58**	-0.06	0.00
Limited/imperfect information	0.21	0.17	**0.35**	0.01	**0.57**	0.02	**-0.37**	0.14	-0.14	0.26
Policy myopia (short-term fix)	0.12	-0.18	0.18	0.02	0.06	0.18	**0.82**	0.05	-0.04	0.09
Fragmentation and weak coordination	-0.04	**0.84**	0.24	0.17	-0.08	-0.23	-0.03	0.01	-0.08	0.12
Weak institutions	0.14	0.16	0.03	-0.09	-0.03	-0.08	0.10	**-0.86**	0.09	0.08
Lifestyle changes and changing diets of urban residents	0.04	0.10	0.15	0.00	0.06	0.05	0.21	-0.08	-0.07	**0.79**
Convenience and time constraints	0.20	0.15	0.10	-0.20	-0.27	0.10	-0.15	**-0.36**	**0.63**	0.27
Consumer preferences	0.06	0.05	-0.20	-0.08	**0.90**	0.01	0.13	0.06	0.03	-0.09
Education	-0.01	**0.86**	-0.01	-0.07	-0.06	0.06	-0.06	-0.09	0.08	-0.03
Social classism	**-0.11**	**-0.26**	**-0.11**	-0.34	0.51	**0.03**	0.51	**-0.02**	**-0.05**	**0.15**

Variable	Policies and prevalence of ultra-processed foods	Education and awareness	Limited government resources	Production incentive	Social classism, consumer preference and affordability	Weak enforcement	Short-term policy and profit motive	Weak institution and fragmentation	High cost	Self-interest and lifestyle changes
High profit motive	-0.03	**0.43**	-0.17	0.17	-0.03	-0.24	**0.60**	-0.15	-0.05	0.28
Aggressive advertisement	**0.39**	0.23	-0.07	0.12	0.07	**-0.61**	0.15	0.03	0.26	0.14
Free market and global trade	-0.19	0.20	-0.09	**0.75**	-0.07	-0.12	0.02	0.07	0.02	**-0.36**
High imports of cheap, ultra-processed foods	0.07	0.06	**-0.60**	-0.17	-0.25	-0.03	0.28	**0.45**	0.06	0.25
Taxes for ultra-processed foods	**0.61**	0.30	-0.07	0.02	0.16	**0.35**	-0.08	**0.38**	0.12	-0.24
Production incentives (subsidies) for healthy diet options	0.20	0.03	-0.13	**0.83**	0.00	-0.06	-0.02	0.11	-0.26	-0.05
Education, awareness and advocacy	-0.28	**0.44**	-0.05	-0.28	0.07	0.20	-0.30	0.24	0.12	0.23
Regulations and standards	-0.09	0.13	-0.15	-0.02	0.10	**0.69**	-0.25	0.04	0.09	**0.31**
Control advertisement	**0.84**	-0.16	0.11	0.17	0.08	-0.14	-0.02	0.17	0.20	0.07
Provide resources for government	0.04	0.25	0.77	0.01	0.09	-0.14	0.22	-0.13	-0.01	0.15
Government policies	0.81	-0.29	-0.21	-0.20	-0.16	-0.05	0.09	-0.15	-0.09	-0.02
Evidence based on research for policy and stakeholder engagements	0.24	-0.40	0.44	0.07	-0.20	-0.07	0.11	0.14	0.50	-0.02
Proportion explained	*0.14*	*0.13*	*0.11*	*0.10*	*0.08*	*0.07*	*0.06*	*0.06*	*0.04*	*0.04*

Note: Rotation method: Oblinim (Kaiser normalization). Factor loadings over 0.30 appear in bold. Bartlett's test of sphericity (chi-square = 3563.413; p-value = 0.000).

Source: In-depth interviews

4.2 Advocacy coalitions in the food environment

Based on the results from the cluster analysis, three coalitions were identified (see Table 3). Results from the cluster membership were matched with transcripts of respondents. The identified policy themes were analyzed to examine the narratives of each respondent in the three clusters. This analysis shows that the identified clusters share similar narratives regarding some policy themes but differed on others.

Following the conceptual framework described in Section 3, the actors within each cluster are referred to as "discourse coalitions", because they share a similar policy discourse, reflecting similar policy beliefs and ideas. The three clusters are labeled "public discourse coalition" (i.e., public sector coalition), and "CSO discourse coalition" (or "CSO coalition" for short) and "private discourse coalition" (i.e., private sector coalition). These labels were selected to reflect the composition of the majority of actors in the three coalitions. However, this does not imply that all public sector actors are members of the public sector coalition or all CSOs are members of the CSO coalition. Table 3 shows the stakeholders that form the three coalitions. A total of 10 stakeholders belong to the public sector coalition, which is dominated by actors from the public sector and CSOs. The twelve remaining actors belong to the CSO and the private sector coalitions. Table A2 in the Appendix shows the number of respondents per theme identified from the transcript, which is also disaggregated by the clusters and frequency of occurrence of themes.

Table 3: Participants in the discourse coalition (identified by cluster analysis)

Coalition members	Public sector coalition	CSO coalition	Private sector coalition
Public	8	3	3
CSOs	2	2	1
Private	0	0	3
Cluster sizes	**10**	**5**	**7**
Total sample size	**N=22**		
Cluster distribution (%)	**45.5**	**22.7**	**31.8**

Note: "CSOs" refers to civil society organizations
Source: In-depth interviews

4.3 Policy beliefs

The policy beliefs held by the public, CSO and private discourse coalitions regarding the food environment are described in this section. These policy beliefs are derived from the interview transcripts, which refer to the ideas about the food environment regarding availability, accessibility and affordability of ultra-processed food, challenges of regulating the ultra-processed food environments and policy strategies needed to transform the food environment.

Policies and prevalence of ultra-processed food

Government policies and the prevalence of ultra-processed food relating to accessibility emerged as a dominant theme in the narratives of all three discourse coalitions. The coalitions argued that ultra-processed foods are mostly accessible in the urban areas of Ghana and consumers do not have to travel long distances to access these foods. An academic respondent in the public discourse coalition mentioned, "These energy-dense and nutrient-poor foods are highly accessible. When you turn left or stretch an arm, you are bound to come across these energy-dense and nutrient-poor foods" (R4).[4]

The use of policy instruments was viewed as necessary to control and reduce the high prevalence of ultra-processed foods in the urban environment. The lack of policies related to nutrition and advertisement emerged from the narratives of the public sector coalition and the CSO coalition as a challenge to reducing the prevalence of ultra-processed foods. According to a respondent, "Well, it is not regulation but the fact that there is currently no policy or legislation regarding marketing unhealthy foods to children….We do not have that kind of mechanism to be able to regulate what product is appropriate to market to children" (R3).

Policy actions including taxes and import tariffs as well as restrictions on advertising and promotion were mentioned as possible ways to control the prevalence of ultra-processed foods. For example, as indicated by a respondent from the CSO coalition, "there should be tax on unhealthy foods" (R15). Concerning advertisement, both the public sector coalition and the CSO coalition agreed on the need for the government to regulate ultra-processed food advertisements. A typical narrative given from the CSO coalition was: "It is very important for the government to pass a legislation which would regulate the promotion and the advertisement of foods and drinks with all the added sugars" (R15). Implementing zoning laws, establishing food composition standards and improving the purchasing power of consumers to buy healthy foods are other suggestions for reducing access to ultra-processed.

Education and awareness

Public education and awareness creation was an important theme emerging from the narratives of the coalitions. In their view, there is a lack of nutrition education and awareness about ultra-processed foods and, therefore, becoming a major challenge to reducing the consumption of ultra-processed foods in Ghana. As a result, metaphors such as "uninformed" and "ignorance" were used to describe consumers' lack of education. A respondent in the public sector coalition highlighted that "lots of people probably do not know that some of those foods are junk foods….They think that they are good and even believe that those are more nutritious than fruits and vegetables" (R1).

[4] "R" stands for "respondent"; "R4" stands for respondent number 4. These labels are used throughout the paper to protect the respondents' anonymity.

The tendency to blame other actors for the persisting challenges in the food environment also emerged. Some members in the public sector coalition blamed CSOs for doing little to create the needed public awareness about the health effects of ultra-processed foods. For instance, a regulator from the public discourse coalition mentioned: “We as regulators, we want to see very strong advocacy going forward in areas that deal with nutrition because per our mandates, we cannot go out and be preaching against what people should eat. Our job is to ensure safety, once the product is safe, it is safe” (R22). Some CSOs also countered this assertion and indicated that they are doing a lot in terms of advocacy and putting pressure on the government to ensure a healthy food environment. Instead, they blamed the media for a lack of information dissemination as highlighted by a member of the CSO coalition: “The media can actually support the dissemination of information….This is very key, so we cannot leave them out” (R15). As a consequence of low levels of awareness of ultra-processed foods, improving communications through strong advocacy and increased education are seen as instruments to encourage behavior changes. As a member of parliament puts it, “Yes, it is good to regulate, but I think that we must first educate the public. Let them understand the advantages and disadvantages of consuming such foods” (R20).

Limited government resources

Resources needed by government agencies to monitor and regulate the food environment was another strong policy belief expressed in the discourse of the three coalitions. Inadequate resources, including human and financial, among others, were seen as challenges to regulating the food environment. This issue was emphasized by respondents in the public sector coalition as follows: “We need more resources in terms of equipment, vehicles and personnel so that these things can be checked regularly and on time” (R6). The inability of the government to provide adequate resources leads to over-reliance on donor support as indicated by a respondent from a government regulatory agency: “Development partners have been the main source of instrument in sponsoring our programs, such as breastfeeding and the national policy on fortification of micro-nutrients” (R22).

In the narratives of the other two coalitions, there is a general agreement about the challenge of limited resources. For example, a respondent from the CSO coalition said “Sometimes the institutions that have been mandated to do the work lack resources to do it” (R9). In this case, they criticized the government for not adequately resourcing these institutions. As a solution to this problem, they highlighted the need for the government to provide the necessary resources for institutions to perform their duties effectively and support advocacy work. As highlighted by a respondent from the private discourse coalition, “All of these public institutions must be adequately resourced….So, the government should be able to resource them effectively” (R16).

Social classism, consumer preference and affordability

Social classism was a recurring theme in the narratives of both public and private sector coalitions, while consumer preference and affordability appear in narratives of all three discourse coalitions. These factors are demand-side drivers of ultra-processed foods and are perceived as posing great challenges to reducing such foods in the urban environment. Regarding social classism, the discourse indicates that the majority of ultra-processed foods in Ghana are imported: "so far most of these foods are imported" (R7). Therefore, such foods are regarded as Western-style convenience foods, which are associated with modernity. Hence, the growing middle-class and upper-class consumers would like to consume such foods to further establish their identity. As a respondent from the public sector coalition puts it, "It looks like people think that if you eat ultra-processed food then you find yourself in the elite bracket. So, when you eat fast foods then you find yourself in the elite bracket" (R7).

Concerning preferences, it is generally perceived that consumers have developed tastes and preferences for these food types. A member of Parliament stated: "People have developed the taste for it, so when people are addicted in a way or used to a certain type of food, it is not easy for them to get out of it" (R19). Preferences of children also drive the consumption of these foods as indicated by a respondent: "The children have cravings for things that are sweet and all of these fast-foods, which develop into an acquired taste" (R18).

Affordability was seen as a major driver of increased consumption of ultra-processed foods. There was a general agreement among the three coalition members that these foods are so cheap that even people with low incomes can afford them. In the words of a CSO coalition member, "They tend to be cheaper so that even the daily income wage earner in these urban areas can go in for these highly processed foods" (R14). From the private sector coalition, it was an opportunity for a positive self-representation. As a member indicated, "It is mostly cheaper. For example, the smaller pack of Indomi (i.e., instant noodles) is GHS 2.50 (USD 0.44)[5], so a person can buy two. Also, if someone has GHS 1.00 (USD 0.18), that person can buy yoghurt or bread" (R13).

The coalition members were in agreement regarding the role of lifestyle changes in influencing food consumption and the shift toward convenient or ready-to-eat foods. For example, a CSO coalition member indicated: "In the urban setting, we all know because of our lifestyle and the trend of changing diets a lot of people really do not have time, and we have a lot of supermarkets and fast-food joints, so a lot of them just walk into the stores and grab a snack" (R15). From the private sector coalition's perspective, the narrative on lifestyle changes and changing diets represented an opportunity to present a positive self-representation as emphasized in this statement: "Basically, you just want to grab anything….So that is what has resulted in us moving into processed foods and the like because

[5] The exchange rate given by the Bank of Ghana at the time of the interviews was USD 1= GHS 5.7071.

of the convenience they provide for consumers. The whole thing is about the convenience and about delivering a certain nutrition in a certain nice format" (R17). The above suggests that the food industry has positioned itself to take advantage of the identified opportunities in the food environment by responding to the needs of consumers.

Short-term policy and high-profit motive

Policy myopia and the high-profit motive of private businesses are narrated as challenges confronting the current food environment. Respondents argued that most policies aiming to address the challenges in the food environment are short-term, quick fixes, which may be driven by political agendas. For example, a respondent for the private sector coalition noted, "You know, politicians would come with their agenda….They know where they want to promote and put people who will be committed to that kind of agenda" (R16). Similarly, they argue that governments' food policies prioritize food production with less attention to other components of the food system, such as distribution, storage and consumption (i.e., consumers' nutrition and health outcomes).

Profit motive was a recurring narrative that appeared in the discourse of the public sector coalition. In this regard, a respondent from a government agency noted: "The food industry is driven by, of course, profits….So, they also invest money into the areas that they think will derive the highest benefits possible" (R22). Profit motives drive the food industry to engage in aggressive advertising and promotion as typified by an academic respondent: "These food products come in all the time with aggressive advertising. They promote 'buy one, get one free', and so you are forced to buy stuff that you may not even have thought of buying" (R5).

Weak institutions, fragmentation and weak enforcement

Institutional weaknesses and fragmentations were major concerns for all coalition members because they are believed to be partly responsible for poor implementation regulations. Accordingly, regulatory institutions were criticized for their lack of effectiveness, as captured in this statement: "We have the institutions, but their ability to work effectively is what we have to deal with" (R11). Institutions are seen as both weak and fragmented. This leads to poor coordination and collaboration among sector ministries, agencies and departments (MDAs), which are responsible for ensuring a healthy food environment. A respondent from the CSO coalition expressed this concern as follows: "I will also talk about the various institutions that are in this sector. Because there is poor coordination, it becomes very difficult for the regulatory authorities to take a stand or take action" (R15). Besides, there were other issues such as overlapping of functions among different government agencies and departments, which according to coalition actors, sometimes leads to misunderstandings.

Weak enforcement appeared prominently in the narratives of all the collation members. This could be a consequence of institutional weakness and fragmentation, as indicated. In particular, both public and CSO coalition members believe that there are already some

existing laws to regulate the food environment. The challenge has been regulatory bodies' capacity to provide proper and effective monitoring to ensure strict compliance. To this end, descriptors such as "weak" and "loose" were used to describe the nature of law/regulation enforcement. A respondent from a government ministry (public sector coalition) stated: "I think even though the regulations are there, we all know that sometimes the enforcement is weak" (R12). Without effective enforcement, the private sector, which produces and markets these food products, can easily evade labeling. The narratives on enforcement also reveal blame-game attitudes among actors responsible for ensuring enforcement of laws/regulations. A typical example is a statement from a respondent of a regulatory agency: "The standards have been set, but the problem is enforcement, which lies with the assemblies and then the FDA" (R6).

High cost of and incentive for producing healthy foods

High costs of production appeared prominently in the narratives of the three coalitions. According to coalition members, the production of healthy foods in Ghana is expensive. In their view, this presents a challenge to providing healthy food alternatives in the food environment. A representative of the Peasant Farmers Association highlighted this problem: "I think the first issue is about the cost of production….if you observe, a lot of farmers have issues about affording agricultural services. So, the farmer needs money to purchase inputs, clear the land, buy equipment, quality seeds and other inputs like fertilizer" (R8). In light of this, some coalition members advocated for production incentives, as presented earlier.

Making healthy food products available also requires the infrastructure for storage, transport, distribution and processing. Nonetheless, it emerged that the costs of having such systems in place are high, as noted by a respondent: "Compared to ultra-processed food, the cost that is involved in ensuring that your perishables stay fresh and appealing, is significantly higher than having your ultra-processed food in the pack that can stay for months and sometimes even years" (R2). In the narrative of the private sector coalition, however, the high cost of producing healthy foods is a motivating factor for entering into the ultra-processed food business. A respondent from the private sector coalition emphasized this point: "Producing healthy foods come with a lot of cost.…If I could give this example, here in this factory, we produce shrimp tablets, but you realize that 12 grams of shrimp tablets cannot be compared to natural shrimp" (R17).

As a strategy to mitigate high production costs and make healthy foods such as fruits and vegetables more available, accessible and affordable, providing incentives to farmers was a dominant narrative of both the public discourse coalition and the CSO coalition. Members of both coalitions believe that providing such incentives will shift consumers' preferences away from unhealthy foods toward healthy foods. A perceived need for the provision of subsidies, such as input subsidies and market price support (for healthy products), was expressed in the discourses of both coalitions. According to an academic, "The policy is to try to make healthy

foods more affordable and how do you do that? It will mean encouraging more farmers to produce more, by providing them with inputs" (R1). A respondent from the CSO coalition stressed this point: "In the area of pricing, it is very important for government to implement subsidies that would increase the affordability of healthy foods" (R15). The idea of providing farmers with incentives to produce healthy foods did not emerge in the narrative of the private sector coalition.

5. Discussion

This study contributes to unpacking the root causes and drivers of the food environment and the influence on the prevalence of the triple burden of malnutrition. The empirical result reveals the presence of public sector, private sector and CSO coalitions in the food environment. The governance challenges that characterize the food environment (due to the differences in interests and ideas of the private sector, public sector, and CSOs coalitions) unravel a "triple sector failure" that drives the prevalence of the triple burden of malnutrition. As mentioned in the introduction section, the existing explanations in the development economics literature often link the triple burden of malnutrition to population growth, rapid urbanization, changing lifestyles and consumer food choices (Ameye & Swinnen, 2019; Fox et al., 2019). In addition to these factors, this study highlights narratives that reveal the ideas, beliefs and interests of the stakeholders driving food environment transitions, with implications for the triple burden of malnutrition.

The food environment narratives of the different coalitions reveal that the food industry offers ultra-processed foods because they are more profitable due to their relatively low cost of manufacturing, storage and transportation. The industry is also guided by consumers' tastes and preferences in producing and selling hyper-palatable, addictive, ultra-processed foods. It appears the food industry is perceived to be largely driven by profit motives and engaged in more aggressive advertising, as echoed by the narratives of the public sector coalition. This criticism can easily be dismissed, especially when profit maximization is the ultimate goal of any company in a competitive food market environment. However, profit interests could drive the food industry to lure consumers and influence consumption patterns with implications on the triple burden of malnutrition. This behavior among sellers is explained by Nobel-Prize-winning economists George Akerlof and Robert Shiller in their book *Phishing for Phools: The Economics of Manipulation and Deception*. In the book, they challenge the notion that free markets lead to material well-being. They argue that in a market equilibrium and given profit motives, food companies will attempt to manipulate ("phish") consumers into buying products that they are led to believe will satisfy their preferences but are not in their best interests ("phools") (see Akerlof & Shiller, 2015). While such profit interest is a smart strategy for food companies, it has implications for solving the malnutrition problem and longtime societal health challenges.

The public sector and CSO coalitions also criticize the private food companies for engaging in lobbying activities. While this is a potential maximization of the political objective function (Swinnen, 2010a; 2010b), the effect of such activities undermines public health promotion efforts and the objective function of CSOs relating to advocating for a healthy food environment. Failure of the food market to provide healthy diet options with implications on human health calls for government legislative intervention to create an environment that promotes healthy foods for consumers. But government policy actions in the food

environment in LMICs have been slow to respond and increasingly challenging to implement due to the growing influence of commercial interests and conflicting policy ideas – leading to state failure in many LMICs. In most developing economies, CSOs could play an important role, for example, by providing consumers with information and via advocacy to make healthy food choices. However, CSOs in developing economies have also been less effective due to information asymmetry, the influence of lobby groups and power imbalances – leading to CSO failure.

Although consumers are the ultimate decision makers in the food environment, most consumers are not perfectly rational due to a lack of perfect knowledge and because they are subject to bounded rationality (Jolls et al., 1998; Scott, 2000; Sunstein & Thaler, 2003). When consumers suffer from such cognitive failures, they make choices that may not maximize their welfare. This is particularly the case in developing economies where food choices are constrained by access to affordable food products, as well as income and food prices. In such situations, Adam Smith's "invisible hand" argument that firms pursuing their own self-interests incidentally promote the welfare of the society does not work because private profits and public health interests diverge. The consumption of ultra-processed food suggests that being overweight or obese with the associated burden of diseases resulting from unhealthy food consumption is not simply an individual choice but is also due to the prevalence of the triple sector failure in the food environment. Thus, the rational choice and bounded rationality arguments are not entirely adequate to explain consumers' choice for ultra-processed foods. Under such circumstances, consumers do not make optimal food choices. To solve this problem, Sunstein and Thaler (2003) proposed an approach based on the concept of "libertarian paternalism". They recommend that with bounded rationality and bounded self-control, libertarian paternalists (i.e., private and public institutions) should steer people's choices to nudge them away from bad choices without eliminating their freedom of choice.

5.1 Triple sector strategies for reducing the triple burden of malnutrition

As shown in this paper, the food environment is failing to deliver healthy food options. Nonetheless, there is a failure on the part of the government (i.e., the public sector) to intervene and either regulate or incentivize the food industry to act in society's interest. Social activism, which is needed to pressure food companies to act in society's interest and hold the government accountable, is lacking or, at best, inadequate. These findings call for solving the triple sector failure in the food environment to find solutions to the triple burden of malnutrition. Inaction to solve the existing malnutrition problem poses several challenges to the limited public expenditure and social welfare. As the COVID-19 pandemic spikes, the food environment must transition to deliver more healthy diet options for building healthy immune systems in developing economies where health systems are inadequate.

The insights from this empirical analysis suggests that policy solutions to the triple sector failure and the triple burden of malnutrition requires "policy innovation bundles" across sectors rather than single "piece meal" sectoral policy instruments. For this to happen, the public, private and CSO coalitions must align ideas, interests, incentives, investments and narratives into a bundled policy innovation that aims at tackling a food environment that stimulates and constrains consumer options to demand ultra-processed foods. These bundled policy innovations include instruments such as taxes and subsidies, regulations, education and food industry changes.

Taxes and subsidies can be used as a bundled policy innovation for transitioning toward nutrition-sensitive food environments. A subsidy can catalyze a decline in food prices or an increase in real income or purchasing power. While government subsidies have often been spent on protecting and incentivizing the production of main staple foods, such as maize and rice (Anderson & Masters, 2009), complementarities to staples, such as fresh fruits and vegetables and grain legumes, have not received much attention. Thus, reducing subsidies on staples, or redistributing subsidy programs to target the production of healthy foods (e.g., fruits and vegetables, grain legumes) could trigger a supply response, lower production costs, increased availability, lower prices, and greater consumption in developing economies. Such subsidies should be in tandem with investment infrastructure (e.g., cooling storage facilities) for handling highly perishable food products to reduce food waste and losses. However, differences in ideas and beliefs about the provision of subsidies prevail due to past governance challenges in managing input subsidy programs and have created an impasse in transitioning food environments (Mockshell & Birner, 2015). Without alignments of ideas and interests on subsides, there are likely to be disagreements among policy actors for the foreseeable future, leading to subpar policies that do not offer any opportunity to transition the food environment.

A prohibitive tax (sin tax) on ultra-processed food could increase the price of unhealthy foods (as producers and suppliers will likely pass the tax on to consumers) relative to healthy food options and limit consumption (due to decline in consumers' real income, purchasing power) (Mockshell et al., 2019). The idea of food taxes has a greater appeal to national governments because of their revenue-raising potential, and taxes have been used by many countries as part of broader strategies to reduce the burden of NCDs (see Popkin, 2020; Thow et al., 2018). However, disagreements on implementing sin taxes remains dominant in the food environment and has caused division among the different actors for several years. The public coalition has often been criticized for implementing sin taxes for self-interests, rather than societal interests. Further, the regressive effects of implementing such a tax could also lead to higher food prices and the rise of the CSO coalitions against national governments. One option is to invest the revenues generated from sin taxes into subsidy programs and education awareness campaigns. The tax could also be targeted at total calories or specific ingredients (e.g., sugar, fat and salt) used in producing unhealthy foods instead of the whole

food product as has been done in other countries, such as the United Kingdom (see, e.g., Madden, 2015; Thow et al., 2018; Wright et al., 2017).

Self-regulation, education and labeling can play a critical role in reducing the presence of ultra-processed food. National governments could enforce food labeling and standards to support consumer decision making. Food companies can join efforts to provide a healthy food environment and, ultimately, reduce diet-related NCDs through self-regulation and awareness through education. Such voluntary regulations may help to reduce the public costs of regulation, particularly in situations where the government lacks the capacity to design and enforce regulations (see Karnani et al., 2016). However, when there is a divergence between the interests of the food industry and society, self-regulation has proven to be ineffective (Karnani et al., 2016). Therefore, to make self-regulation effective and not self-serving, particularly in developing economies with weak monitoring systems, Sharma et al. (2010) propose basic standards that should be met. These include multi-stakeholder engagements (involving scientists, nongovernmental organizations, global governance and industry), with no single party given disproportionate power, setting useful objectives and targets with codes of acceptable behaviors and undertaking external and objective evaluation, including mandatory public reporting of adherence to codes and oversight by an appropriate global regulatory or health authority.

6. Concluding remarks

The urban food environment in developing economies is changing rapidly toward the consumption of ultra-processed foods, which is strongly linked to the increasing risk of diet-related diseases. The findings indicate that problems associated with the increasing availability of ultra-processed foods and the related health risks contributing to the triple burden of malnutrition have been fueled, in large part, by the triple sector failures. Transitioning food environments to reduce access to affordable ultra-processed food requires alignment of interests, ideas, incentives and investments among the public, private and CSO coalitions identified in this study. Solutions to the triple burden of malnutrition require policy innovation bundles to solve the triple sector failure. Thus, examining the problem of the triple burden of malnutrition using a political economy and governance lens helps to explain the drivers of the food environment and to analyze policy innovation bundles that can contribute to reducing such failures. We argue that a combination of regulatory mechanisms, coupled with considerable coordination and cooperation among the various actors in the food environment, are needed if there is to be a meaningful reduction in the triple burden of malnutrition, particularly overweight/obesity and the associated risk of NCDs, in developing economies. In the wake of the COVID-19 pandemic, addressing the triple sector failure and reducing the risks of NCDs is not only important from a food and nutrition perspective, but also as an important strategy for building resilience to unexpected shocks due to pandemics and accelerating progress in transforming food systems.

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Appendix A

Table A1: Storylines and policy beliefs identified in the discourse analysis

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
High availability of ultra-processed foods	1. There are a lot of sales of processed foods in our neighborhoods by hawkers, in small stores, supermarkets, gas stations and even open markets. (R3) 2. They are more available, more common now than ever. (R1)	They are mostly available that is why we decided to go into the production of this kind of food. (R13)	In terms of availability, they are all over. You can see them everywhere. (R15)
High affordability of ultra-processed foods	1. It seems that they are more affordable than some of our traditional food products. It is cheaper to buy a can of fruit drink than to buy one or two oranges or bananas. (R1) 2. Sugar-sweetened beverages are relatively cheaper than fruits and vegetables, irrespective of the season. (R2)	It is mostly cheaper. For example, the smaller pack of Indomi is GHS 2.50, so a person can buy two. Also, with just GHS 1.00 a person can buy yoghurt or bread. (R13)	1. They tend to be cheaper so that even the daily-income wage earner in these urban areas can go in for these highly processed foods. (R14) 2. Yes, some are also cheap. So, they are able to reach a large majority of people in terms of their income as well. (R10)
High accessibility of ultra-processed foods	These energy-dense and nutrient-poor foods are highly accessible. When you turn left or stretch an arm, you are bound to come across these energy-dense and nutrient-poor foods. (R4)	They are mostly accessible. (R13)	In terms of accessibility, you will find fast-food joints, especially at every bus stop in Accra. (R15)
Government failure			
High cost of producing healthy diet options	1. Sometimes the production cost is also a bit high so, by the time you finish producing a liter of coconut oil, the price may be higher than what has been imported. (R11) 2. If you compare how much it costs to produce green leafy vegetables to chips, obviously chips are going to be cheaper. (R2)		I think the first issue is about the cost of production….If you observe, a lot of farmers have issues about affording agricultural services. So, the farmer needs money to purchase inputs, clear the land, buy equipment, quality seeds and other inputs, like fertilizer. (R8)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Inadequate standards and regulation	1. The FDA is only in charge of safety but not nutritional content. (R22) 2. I think that there is room for legislation. We need new legislation on how to communicate food information and also strengthen the existing ones to prevent unethical marketing of processed foods to our population. (R3) 3. There are signboards in many school premises that are sponsored by food companies. That in itself is a challenge, and it needs to be regulated. But the problem is that we currently do not have specific regulations on what kind of restrictions should be in place for marketing unhealthy foods to children. (R3)	We do not also have standards for most of these foods. So, there are lots of foods coming up without a codex standard or a local standard. (R17)	1. I think that in terms of regulations, we have not had very effective laws that try to regulate the consumption of these foods very well. (R8) 2. The FDA is not into probably the nutritional component of the food. The FDA will approve a particular ultra-processed food, but probably that food could have its side effect on the consumer. (R8)
Lack of enforcement	1. The laws are there...the regulations are there, and we are a country that signs up to any Pact. We have the Food and Drugs Authority (FDA) and the Ghana Standards Authority. They test all these foods and make ad-hoc visits. But you see, not only are they fewer, but enforcing these regulations is a challenge. (R4) 2. I think even though the regulations are there, we all know that sometimes the enforcement is weak. (R12)	1. The regulatory agencies are aware of what is good and what is not good. As I said, regulations must be a bit strict. (R17) 2. Many of these products around are FDA approved, but you find all kinds of breaches, e.g., labeling food products in terms of the breakdown of nutritional contents. (R17)	1. The major challenge is the enforcement of our laws and also trying to come out with clear standards for these foods. (R10) 2. We have had concerns about who is regulating the processing of these foods and ensuring that the standards are being met, and we have stories about people sharing experiences of unwholesome foods that they have bought which have wrong labeling. (R9)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Limited resources	1. I know sometimes the enforcement is limited by budgetary constraints or even the human resource capacity to monitor. (R12) 2. The other challenge relates to resources that we have, for example, human resources. We have the capacity to be able to go round and do surveillance but we cannot even do that because we do not have the resources. (R2)	All of these public institutions must be adequately resourced. The government should be able to resource them effectively. (R16)	Sometimes the institution that has been legalized to do the work lacks resources to do it. (R9)
Policy maker (politician) self-interest	In regulating, you may have to brush shoulders with some "invisible tigers"…because these people (e.g., wholesalers) are those who bring these foods into the country. (R11)		1. These big private firms have the money to sponsor the politicians and their likes...they sometimes influence the politicians so that they are not able to stop them from producing these foods. (R10) 2. Frankly, it is quite difficult but, first of all, looking at the political will and interest, you will be surprised to know that powerful people are behind the importation of such foods in the country. So, if you have such powerful people who are behind these foods getting in the country, the question is how do you stop them from doing their business? …it is quite difficult. (R8)
Influence of lobby groups	The people who bring in these foods are wealthy people who can push wealth to break barriers of regulation. So, they drive the market. (R20)		But they are powerful people who are importing rice into the country and these people are connected to the powers that be. (R8)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Lack of policies	1. Well, it is not regulation but the fact that there is currently no policy or legislation regarding marketing unhealthy foods to children….We do not have that kind of mechanism to be able to regulate what product is appropriate to market to children. (R3) 2. You can use laws or regulations to control the sugar or salt content of foods. You know these things take time and always people would fight and lobby. (R1)		It is very important for the government to pass legislation that would regulate the promotion and the advertisement of foods and drinks with all the added sugars. (R15)
Limited/imperfect information	In foreign countries and I think these days, it is also creeping in here, they put in labels on food with very high sugar content. For instance, if you take a soda in the United States, they tell how much sugar content is in one 250ml of soda. So, it is mandatory for the manufacturer to put labels. (R18)		There are still a lot of products in the market that do not have these labels for you to have confidence that the product you are buying is actually safe. (R15)
Policy myopia (short-term fix)	A lot of government policy actions have been focused on production, like what the current Minister of Agriculture is championing through the Planting for Food and Jobs. That is the very first step in the food value chain. But if you do not follow through to the point of distribution, storage and value addition, you will still face the same challenge, in the sense that the food is still going to be expensive at the time it gets to the consumer. (R3)	You know, politicians would come with their agenda...they know where they want to promote and put people who will be committed to that kind of agenda. (R16)	

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Limited coordination among sector ministry (fragmentation and weak coordination)	1. It is not easy to get things done across ministries and agencies because each of them is trying to stick to their mandates. So, the major challenge is getting the coordination to happen….You would see a lot of them doing things in isolation and that leads to repetition of same things. (R1) 2. There have been a few conflicts between FDA and some agencies. (R11)		1. It is very important for us to coordinate the market, the system, or people or players that are operating in the ultra-poor environment or ecosystem. I cannot clearly see any coordination in terms of their operations. (R15) 2. But I must also talk about the various institutions that are in this sector. Because there is poor coordination, it becomes very difficult for the regulatory authorities to take a stand or an action. (R15)
Weak institutions	We have the institutions but their ability to work effectively is what we have to deal with. (R11)	We have regulating boards around that have to set out standards for production but are not up to the task. They have to back up their game. (R13)	Lack of structures or systems to implement even the few policies that we have. (R14)
CSO and consumer failure			
Lifestyle changes of urban residents and changing diet patterns	1. Well, what I have realized is that over the past few years, there has been a shift toward more westernized diets, as opposed to the kind of diet that we used to have when we were children. Now you have fast-food joints, such as KFC, springing up in Ghana. We did not have this 20 or 30 years ago….So, things are changing. (R18) 2. People will spend a lot more time in their workplaces and would not have enough time for food preparation, and so on. So, they prefer to go for those kinds of foods, especially women who are very much engaged. (R5)	These foods are growing because of urbanization, the developing middle class, and time constraints. For example, you do not expect a lady who goes to work as a bank executive and comes home at 8:00 pm to go to the kitchen and cook. So, they need convenience food. (R16)	In the urban setting, we all know because of our lifestyle and the trend of changing diets, a lot of people really do not have time and because we have a lot of supermarkets and fast-food joints, they just walk into these stores or supermarkets to just grab a snack. (R15)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Convenience and time constraints	1. If you want to prepare boiled plantain with Kontomire stew, it takes a little bit of time, however, if you want to get something like Indomie, it takes a very short time...five minutes and the Indomie is ready. (R7) 2. The time constraint on a typical urban person moving from one point to the other. You come home late and you want something convenient…a quick fix to feed your family. (R11)	1. We have high proportions of ultra-processed food in the food environment because mostly that is what we prefer, it is faster and it is on the go…you can just take it at any time, but if you want to eat well you have to go to the market and buy your plantain and garden eggs, which takes a lot of time. (R13) 2. Basically, you just want to grab anything…so that is what has resulted in us moving into processed of foods and the likes because of the convenience they provide for consumers. The whole thing is about the convenience and about delivering a certain nutrition in a certain nice format. (R17)	1. Because those are convenient, they are faster to do. They take less time and you do not need or require a lot of energy to do that. (R8) 2. Also, we can talk about how fast in terms of preparing these foods. They do not take so long a time to prepare. People do not have time so they want something that they can eat within the shortest possible time. (R15)
Consumer preferences	1. People have developed a taste for these foods. So, when people are addicted in a way or used to a certain type of food, it is not easy for them to get out of it. (R19) 2. Most people have developed a taste for this type of foods. So, to change their taste or attitudes toward patronizing these foods to more healthy ones needs a gradual process. (R21) 3. The children have cravings for things that are sweet and all of these fast foods, which develop into an acquired taste. (R18)	Yes, people are getting used to these foods. They have developed tastes for these products. (R17)	It meets the needs of even the consumers. (R15)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Education	1. People are less educated on the harmful effects of these foods. (R7) 2. One problem is lack of education…so once it is affordable you find people buying. But if we know the long-term implications of consuming these foods, we will change. (R11) 3. One crucial thing that is missing in this country, which even I, as a regulator, find frustrating, is advocacy. You see, without strong advocacy, every regulator will go and sleep. (R22)	1. So, the challenge in regulating the ultra-processed food environment is education. (R13) 2. People are not well informed so they just grab anything. (R17)	Again, issues around education and consumer awareness are very key because it is not only about those selling but also those who are buying. How well informed are we as consumers? If we know the implications and the health issues that are associated with these foods, I want to believe that a lot of people who consume these foods would actually stop buying. (R15)
Social classism	1. That is the lifestyle you live when you are successful. You eat those kinds of processed foods. (R3) 2. People think that if you eat ultra-processed food then you find yourself in the elite bracket. So, when you eat fast foods then you find yourself in the elite bracket. (R7) 3. Most people who call themselves high-class people do not want to be seen standing by the roadside buying food probably because of the environment. So, they prefer going to shops that sell these types of foods. (R21)	So, it is in the how do you call these people…"the me too" group who can afford it. People go to KFC. You think everybody can just get up and go to KFC? (R16)	

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Private sector failure			
High-profit motive	1. The companies distributing these foods are private companies and are there to make a profit. So they look at the opportunities and look at what will maximize their profit because they have made investments. (R3) 2. The industry will be driven by, of course, profits and will invest money into the areas that will derive the highest benefits. (R22) 3. These people (e.g., wholesalers) who bring these foods into the country make a fortune out of them. (R11)		
High production cost of healthy diet alternatives		Producing healthy foods comes with a lot of cost....If I could give this example, here in this factory, we produce shrimp tablets, but you realize that 12g of shrimp tablet cannot be compared to natural shrimp. (R17)	
Aggressive advertisement	1. There is an increasing promotion of processed foods. If you drive through any of the major streets in Accra, you will see very large-size billboards promoting different kinds of foods. But you are unlikely to see the promotion of fresh foods. (R3) 2. You know, they come with very strong advertisements and try to encourage people to patronize or consume these products. (R5) 3. They come in all the time with aggressive advertising. They promote “buy one, get one free”, and so you are forced to buy stuff that you may not even have thought of buying. (R11)		They are backed by huge commercial adverts making them quite appealing. For instance, if you are watching a TV program with your child and there are ads about these processed foods, they tend to prefer such products. (R8)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Free market and global trade	1. We have open borders so, a lot of things come in. You know we have liberal trade policies, and you cannot ban importations of some foods. (R11) 2. Today our borders are porous and open to all sorts of foods, including processed foods that are high in sugar, fats and salts that come into our country, Ghana. (R4)		1. We talk about sometimes the regulation in place, but there are also free markets. Can the government determine that it will not allow the companies to bring these products into the country because they are unhealthy or allow people the freedom to choose? (R9) 2. In fact, the influx of foreign goods into our system has played a very key role due to the opening up of our markets. (R8)
High imports of cheap, ultra-processed foods	1. Well, so far most of these foods are imported. (R7) 2. A significant portion of the processed foods that we are seeing is imported. (R3)	I think that a chunk of these foods is coming from importation. (R17)	You know, the majority of these products are imported. (R10)
Policy strategies (fiscal, personal, farm level)			
Taxes for ultra-processed foods	1. I do not think we should reinvent the wheel. There are things that others have done that had been shown to be worthwhile. For example, the use of tax on unhealthy foods. (R3) 2. Increasing taxes on such foods will be good, but it should be target specific. Otherwise, when you target everything, it will affect other things that should not be affected. (R6)	We should tax unhealthy foods heavily to make them more expensive. (R17)	1. If there is a way that we can tax these particular foods at relatively higher tariffs to increase their prices and discourage their consumption, that would be good. (R8) 2. There should be a tax on unhealthy foods to raise their prices. (R15)
Production incentives (subsidies) for healthy diet option: fresh fruits and vegetables	1. The policy is to try to make healthy foods more affordable, and how do you do that? It will mean encouraging more farmers to produce more by providing them with inputs. (R1) 2. The Ministry of Agriculture or government should ensure that vegetables and fruits are less expensive and available most of the time. This goes back to irrigation policy, i.e., encourage the production and the growing of a lot of these things, then we can begin to see more of these healthy foods in our food system. (R1)		1. In the area of pricing, it is very important for the government to implement subsidies that would increase the affordability of healthy foods. If you want people to eat healthy foods, then there should be a subsidy on those foods. (R15) 2. There could be government subsidies....I think the Planting for Food and Jobs program has subsidies for farmers. If they have this diversity and then nutrition behind, it will go a long way to help improve what we have nutritious foods in the environment. (R14)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Education, awareness and advocacy	1. First of all, we need to educate people intensively; intensive education is very, very important. (R6) 2. Yes, it is good to regulate, but I think that we must first educate the public. Let them understand the advantages and disadvantages of consuming such foods. (R20) 3. Public education is very important so that people would know the importance of eating healthy diets and know the implications for eating those kinds of ultra-processed foods. Education would have to come in here in terms of communication, using relevant media and so on. (R5)	It has to do more with the education for people to understand the effects of processing in general. So, if there is more conscientization and education for people to believe in natural food, that will be good. (R17)	1. So as a civil society organization, we do a lot of advocacies around that and make sure that the government is doing the right thing, so we advocate for both the demand and supply sides. (R15) 2. The media can actually support the dissemination of information...this is very key so we cannot leave them out. (R15)
Regulations and standards	1. We need to be strict with the food environment regime, it looks like we are too relaxed. The food environment regime should be strictly regulated because everybody takes food. (R6) 2. Enforcement of laws on labels, especially for some of these canned, preserved foods on the kind of sugar or salt, and provide sanctions and penalties for companies who flout them. (R18)	I believe it is all about taking our regulations seriously and making sure every food product is well assessed, standards are developed, and is well regulated by regulating bodies. (R17)	If we enforce regulations on the importation of these products or processing of these products, it will prevent a chunk of these ultra-foods on the Ghanaian market. (R10)
Control advertisement	We need to strengthen our regulations regarding how, what kind of advertising is appropriate, what kind of advertising should be targeted at vulnerable groups, and what kind of advertising can be done in an environment where children would be affected. (R3)		1. It is very important for the government to pass a legislation which would regulate the promotion and advertisement of foods and drinks with all the added sugars. (R15) 2. A lot of adverts that are allowed on television and the media and all that we see are influencing what people go to buy. If there is a strong regulation around unhealthy foods, a lot of people would actually not go in for junk foods. (R15)

Themes (ideas/policy beliefs)	Public	Private	CSO
Challenges in the urban food environment			
Provide resources for government	We have development partners and maybe from experience they have been helping a lot in our work. Development partners have been the main source of instrument in sponsoring our programs, such as breastfeeding and the national policy on fortification of micro-nutrients. So, we need them to be able to continue to do our work. (R22)	All these public institutions must be adequately resourced. So, the government should be able to resource them effectively. (R16)	1. The government needs a lot of resources, for instance, financial resources to be able to work and implement policies. (R15) 2. It is also very important for the government to support nutrition advocates in terms of financial resources, knowledge and research and development. (R15)
Government policies	1. Some of the policies include ensuring that the retail environment is a healthy environment, for example, having zoning laws. (R2) 2. We need policies relating to food composition. Such policies are interested in ensuring that those who produce food reduce the amount of unhealthy food components. (R2)	Some of the policy strategies include setting out standards of production for everyone. (R13)	Anything that will work toward improving the purchasing power of people is also key because if nutritious foods are available, people will be economically sound to purchase these nutritious foods without hindrance. (R14)
Evidence based on research for policy and stakeholder engagements	If we have a robust system that is generating data, that data can be used for advocacy, inform policy, promote the implementation of the policy, and evaluation of same. Then ultimately, we would have a food environment that has only healthy foods. (R2)	My policy is always to do further research and development to come up with the best that can be done. But we do not just rest there, we need to invest in product development and encourage strong collaboration with the research institutions. (R16)	If probably we know that there is a high proportion of ultra-processed foods in the system and we have been able to do an empirical study to determine the kind of diseases we are getting in Ghana, probably that can force a policy change to limit the type of those foods that will be allowed into the country. (R8)

Source: In-depth interviews

Table A2: Policy themes in the narratives of respondents

Themes	Public coalition	CSO coalition	Private coalition	Number of respondents	Frequency of occurrence
High availability of ultra-processed foods	10	4	5	19	21
High affordability of ultra-processed foods	5	4	5	14	27
High accessibility of ultra-processed foods	3	3	4	10	16
High cost of producing healthy diet options	2	2	2	6	9
Inadequate standards and regulation	3	2	2	7	15
Lack of enforcement	5	0	6	11	21
Limited resources	4	2	3	9	13
Policy maker (politician) self-interest	2	2	0	4	7
Influence of lobby groups	5	2	0	7	9
Lack of policies	2	2	0	4	9
Limited/imperfect information	1	1	0	2	2
Policy myopia (short-term fix)	1	0	1	2	2
Fragmentation and weak coordination	0	4	1	5	7
Weak institutions	1	2	4	7	10
Lifestyle changes and changing diets of urban residents	7	3	3	13	15
Convenience and time constraints	4	4	7	15	22
Consumer preferences	5	1	1	7	8
Education	0	4	4	8	10
Social classism	4	0	2	6	6
High profit motive	1	2	0	3	4
Aggressive advertisement	4	5	1	10	18
Free market and global trade	2	3	0	5	5
High imports of cheap, ultra-processed foods	5	2	3	10	13
Taxes for ultra-processed foods	4	3	4	11	12
Production incentives (subsidies) for healthy diet options	5	4	1	10	13
Education, awareness and advocacy	3	2	4	9	19
Regulations and standards	2	0	2	4	6
Control advertisement	2	2	1	5	6
Provide resources for government	0	2	1	3	4
Government policies	2	0	2	4	7
Evidence based on research for policy and stakeholder engagements	1	1	1	3	3

Source: In-depth interviews

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