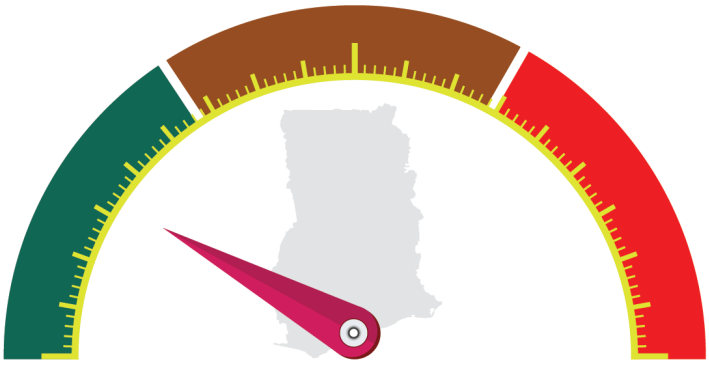
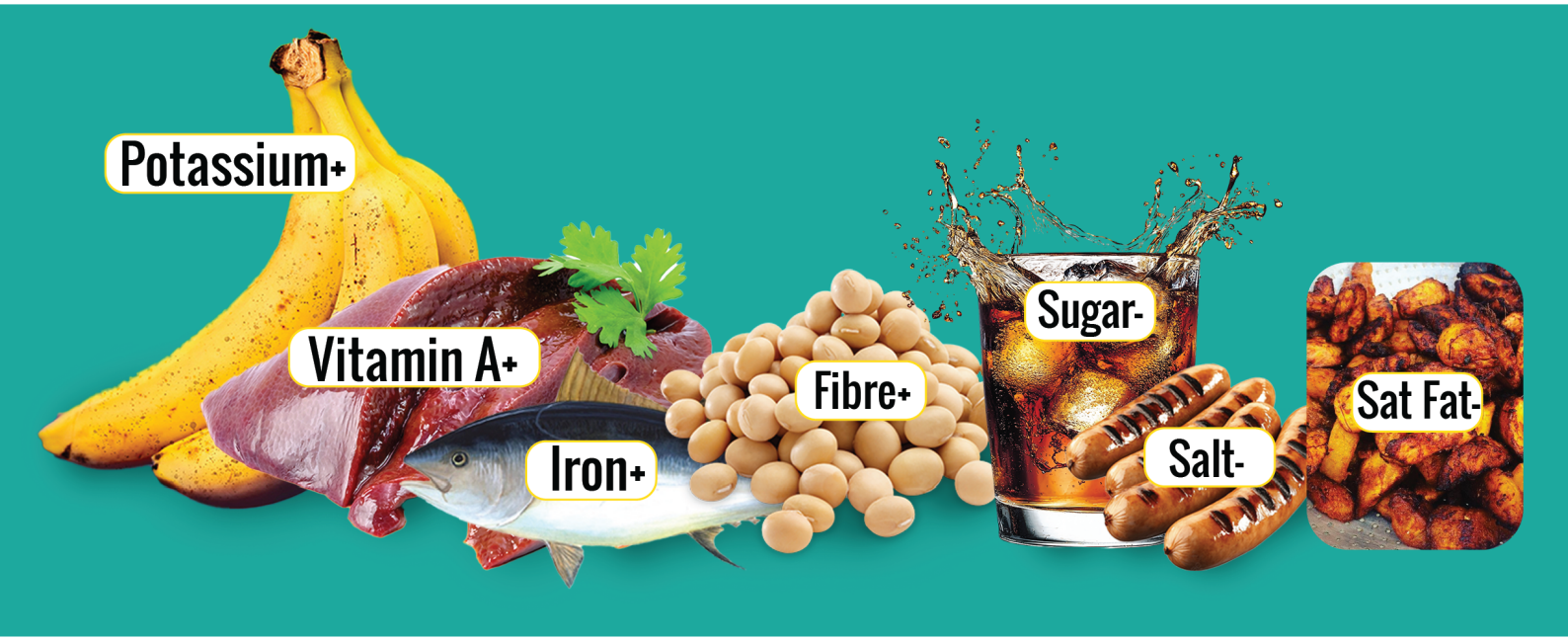
THE GHANA DOUBLE-DUTY NUTRIENT PROFILING SYSTEM





FOOD AND DRUGS AUTHORITY

Your Well-being, Our Priority.

THE GHANA DOUBLE-DUTY NUTRIENT PROFILING SYSTEM

Produced by:

The Ministry of Health (MOH), Food and Drugs Authority (FDA)

All enquiries regarding the Ghana NPS should be addressed to:

The FDA, No. 17 Indian Ocean Street, Nelson Mandela Avenue. P.O. Box : CT 2783, Accra, Ghana.

Telephone: +233 (0)3022 35100 Email: fda@fda.gov.gh

Recommended Citation: Ministry of Health, Food and Drugs Authority (2025). The Ghana Double-Duty Nutrient Profiling System (NPS). Accra, Ghana.

DECEMBER 2025

GENERAL DISCLAIMERS

- Any mention of a company, manufacturer's product, or brand in this document does not imply endorsement or recommendation by the Ghana Nutrient Profiling System (NPS) - in preference to others of a similar nature that are not mentioned. Likewise, such references do not imply penalization, discrimination, or stigmatization of the mentioned or unmentioned brands, unless explicitly stated.
- All reasonable precautions have been taken by the authors to verify the information contained in this publication. However, the responsibility for the interpretation and use of the material lies with the reader. In no event shall the authors be liable for any consequences arising from its use.
- The authors of the NPS have made every effort to ensure accuracy; however, some errors or omissions may remain.

CONTENTS

FOREWORD

Ensuring that food environments are healthy is fundamental to safeguarding public health. In Ghana, the rising burden of diet-related non-communicable diseases (NCDs), alongside persistent undernutrition and micronutrient deficiencies, underscores the urgent need for strategic, evidence-informed interventions. The Ghana Double-Duty Nutrient Profiling System (NPS) represents a pioneering effort in this regard. It is an innovative tool designed to underpin food policies that promote healthier diets across all population groups in Ghana.

Nutrient profiling is a globally recognized approach to classifying foods based on their nutritional quality. The Ghana NPS aligns with international best practices while being tailored to the unique dietary landscape, public health priorities, and regulatory needs of Ghana. This system will serve as a foundation for critical food-based policies, including front-of-pack labeling, food marketing restrictions, fiscal measures, and public food procurement programs. By integrating scientific rigor with practical applicability, the Ghana NPS strengthens our national commitment to improving food environments and ensuring that consumers are equipped with the necessary information to make informed dietary choices.

The successful development of this system is a testament to the collaborative efforts of the Food and Drugs Authority and academia (in this particular instance, the University of Ghana School of Public Health), civil society, and key international partners. This multi-stakeholder approach ensures that the Ghana NPS is not only grounded in the best available evidence but also positioned for effective implementation and sustainability.

For us at the FDA, this document has come at the right time, and it is my hope that it will serve its purpose of providing evidence for the four policies that aim to reduce the double burden of nutrition in Ghana. On behalf of the Food and Drugs Authority and our esteemed partners, I commend all the stakeholders who have contributed to this groundbreaking initiative. It is our firm belief that the system will play a transformative role in addressing Ghana's double burden of malnutrition and in advancing the nation's public health agenda. We look forward to continued collaboration as we work towards a healthier and more nutritionally secure future for all Ghanaians.

Professor Kwabena Frimpong-Manso Opuni
CEO, Food and Drugs Authority

PREFACE

The human body, in its infinite complexity, thrives on a delicate balance of nutrients, energy, other food components, and metabolic pathways that sustain life. In the current food environment marked by industrialization, commercialization, and unhealthy dietary practices, this equilibrium is under siege. Ghana, like many nations, faces a nutritional paradox - where undernutrition coexists with rising overweight, obesity, and an epidemic of other diet-related non-communicable diseases (NCDs). These challenges are not accidental; they are the consequences of food environments that increasingly promote unhealthy dietary patterns.

To effectively address these challenges, a comprehensive, evidence-based approach is required to support policy measures that simultaneously curb the consumption of health-harming foods and promote the intake of health-promoting foods. At its core, nutrient profiling is the science of discernment - the rigorous classification of foods based on their nutritional composition, guided by epidemiological evidence, metabolic science, and local public health needs. Borrowing from existing models, yet refined through local scientific rigor, the Ghana NPS is built on the principle of double-duty action - helping to combat diet-related NCDs while addressing the high burden of undernutrition in the country.

The system is designed not just to inform but to transform by steering regulatory frameworks, guiding consumer behavior, and ultimately shaping the national food environment into one that aligns with health, sustainability, and equity. Its applications are far-reaching – from front-of-pack labeling (FOPL) systems that warn and guide, to marketing restrictions that insulate vulnerable populations from food marketing actors with predatory tendencies, public food procurements, to fiscal policies that recalibrate economic incentives toward nourishment rather than disease. Overall, it provides a foundation for Ghana to shape food environments and make healthier choices the easier choices.

Developing the Ghana NPS has been a meticulous, multi-phase process involving extensive research, stakeholder engagement overseen by a Multi-Stakeholder Technical Task Team (M3T), and a rigorous validation process. Spearheaded by the Food and Drugs Authority of the Ministry of Health, and the School of Public Health of the University of Ghana, this initiative embodies a collaborative governance model that integrates perspectives from government and academia. The system is launched with the full weight of scientific evidence and governmental resolve.

As Ghana takes a bold step in implementing this robust nutrient profiling system, its success will depend on continued research, periodic updates, and strong enforcement mechanisms.

The contributions of all individuals and institutions have been invaluable in shaping this initiative, and we extend our deepest gratitude for their expertise, commitment, and collaboration.

Professor Amos Laar and Mr. Percy A. Agyekum
Co-Chairs, Ghana Nutrient Profiling System Development Committee

ACKNOWLEDGEMENTS

The Ministry of Health´s Food and Drugs Authority (FDA) gratefully acknowledges the collective expertise, commitment, and collaboration of the many institutions, organizations, and individuals who contributed to the development of the Ghana Double-Duty Nutrient Profiling System (NPS). This initiative marks a significant milestone in Ghana's ongoing efforts to improve food environments and public health outcomes.

The successful development of the Ghana NPS would not have been possible without the Healthier Diets for Healthy Lives (HD4HL) Project, which provided the resources, research foundation and policy support necessary for its formulation. The project's coalition comprises government agencies (the Ministry of Health, Food and Drugs Authority, and National Development Planning Commission, Ministry of Food and Agriculture, Ministry of Finance), academia (led by the University of Ghana School of Public Health), and civil society (led by the Coalition of Actors for Public Health Advocacy).

We are deeply grateful for the financial support provided by the International Development Research Centre (IDRC-Canada) and The Rockefeller Foundation through the HD4HL Project. Their generous funding has been critical in enabling the research, development, and implementation of the Ghana NPS.

Under the leadership of Professor Amos Laar and Mr. Percy Adomako Agyekum (Co-Chairs of the NPS sub.M3T), the Committee provided the technical oversight that shaped the system's design and application. We express our deep gratitude to the Tufts University Food Compass Team, and the WHO whose expertise and guidance were critical in respectively adapting their Food Compass Nutrient Profiling Model and the WHO Nutrient Profiling Model to Ghana Nutrient Profiling System. Their scientific contributions and technical assistance have been instrumental in ensuring that the Ghana Nutrient Profiling System is robust, evidence-based, and contextually relevant.

The field data collection process benefited from tools and expertise shared by the University of Western Cape, South Africa, and the Université Cheikh Anta Diop de Dakar Faculté des Sciences et Techniques - Département de Biologie Animale, Laboratoire de Recherche en Nutrition et Alimentation Humaine. We thank L'Abbe Lab/the University of Toronto Food Label Information Programme (FLIP) team for helping curate the food composition database.

Finally, we extend our sincere appreciation to all members of the HD4HL Project Advisory Committee for their invaluable contributions. A complete list of contributors can be found in Appendix 1.

Designed and typeset by Anthony Frank Nii Oku Nelson.

ABBREVIATIONS

COI	Conflict of Interest
FCS	Food Compass Score
FDA	Food and Drugs Authority
FLIP	Food Label Information Program
FOPL	Front-of-Pack Labeling
GSS	Ghana Statistical Service
GNPS	Ghana Nutrient Profiling System
HD4HL	Healthier Diets for Healthy Lives
IDRC	International Development Research Centre
M3T	Multi-Stakeholder Technical Task Team
MDD-W	Minimum Dietary Diversity for Women
MOH	Ministry of Health
NCDs	Non-Communicable Diseases
NPM	Nutrient Profiling Model
NPS	Nutrient Profiling System
NPFPNL	National Policy on Front-of-Pack Nutrition Labeling
NOVA	A food classification system based on processing level
PPMED	Policy, Planning, Monitoring, and Evaluation Directorate
ROC	Receiver Operating Characteristic
SDGs	Sustainable Development Goals
SPH	School of Public Health
UNICEF	United Nations Children's Fund
WAFCT	West Africa Food Composition Table
WHA	World Health Assembly
WHO	World Health Organization

01

INTRODUCTION

1. INTRODUCTION

Guaranteeing food security, is a persistent challenge for nations worldwide. "Food security exists when all people at all times have physical, economic, and social access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life"[1], is a persistent challenge for nations worldwide. Unhealthy food environments, characterized by the widespread availability and promotion of energy-dense, nutrient-poor foods, undermine efforts to achieve food security[2]. With food insecurity, malnutrition, and diet-related health problems on the rise, public health agencies are stepping up efforts to support, promote and protect health. Key among these efforts is limiting the consumption of nutrients and dietary components of public health concern including saturated fatty acids, trans fatty acids, free sugars, and salt, while encouraging the shift toward nutritious, healthier and more sustainable options[3-5].

In recent decades, international organizations, including United Nations agencies such as the World Health Organization (WHO), Food and Agriculture Organization (FAO), United Nations Children's Fund (UNICEF) and several international civil society organizations have called for action to promote healthy diets by limiting nutrients and dietary components of public health concern. These efforts have spurred the development of legal and regulatory measures; food-based dietary guidelines, and food-based policies in many countries. The current initiatives highlight both the need to define targeted foods as well as the challenges in doing so. To tackle these challenges, governments are turning to effective tools and approaches including nutrient profiling - **"the science of classifying and ranking foods based on their nutritional composition"**[6-13].

Over the past three decades, more than one hundred nutrient profiling models (NPMs) have been developed across the world by governments, public health authorities, the food industry, and independent researchers [13]. Some of these models have supported interventions including food labeling[14], marketing restrictions[15], healthier food procurement policies[16], and product reformulation[17]. The WHO highlights the critical role of NPMs in identifying unhealthy foods and promoting nutritious options, guiding consumers toward healthier diets and improved food choices[6, 7]. NPMs are many, diverse and must be adapted and applied in context-specific ways to maximize their impact.

Resourcing, retooling, and facilitating public health and regulatory agencies to scientifically define healthier food options is one of the topmost priorities of Ghana's Ministry of Health (MOH). To this end, a coalition of government agencies (including the Ministry of Health, Food and Drugs Authority, National Development Planning Commission, Ministry of Food and Agriculture, Ministry of Finance), Academia (the University of Ghana School of Public Health) and Civil Society (Coalition of Actors for Public Health Advocacy) are collaborating and leveraging their resources to support Ghana's effort to develop a Nutrient Profiling System (NPS). This system will underpin the implementation of several food-based policies. Referred to as a bundle of double-duty food-based policies, the initiative is part of the '**Healthier Diets for Healthy Lives (HD4HL) Project**', which among others, aims to create an enabling environment that informs and empowers; guides and influences, or incentivizes food actors to act healthfully within their food environments.

1.1. Background

This section summarizes the national health context, Ghana's public health nutrition landscape, and the broader food and nutrition policy environment.

1.1.1. National health context

Located on the west coast of Africa, the Republic of Ghana has a population of about 36 million people; majority of whom live in urban areas where the food environments are rapidly changing. In 2015, Ghana achieved a target of the Millennium Development Goal 1 **(halving the proportion of people who suffer from hunger)**. Ghana is currently on course to achieve a 5% reduction in the number of stunted children by 2025. This is one of the global targets set by the World Health Assembly (WHA) as well as a stunting-related sub-target of Sustainable Development Goals (SDGs) – Goal #2 – to be achieved by 2030. Life expectancy at birth is 61 years for men and 64 years for women. Mortality among children under-5 years and women of reproductive age has declined steadily over the last three decades but remains unacceptably high. A high burden of infectious disease and malnutrition in all its forms - undernutrition, micronutrient deficiencies and an epidemic of obesity other diet-related non-communicable diseases (NCDs) are the key drivers of mortality.

1.1.2. Public health nutrition context

In the past three decades, Ghana has witnessed significant improvements in childhood undernutrition. Data from the Ghana Demographic and Health Survey (DHS) show that among children under-5 years, stunting rates (indicative of chronic undernutrition) have declined from 28% in 2008 to 18% in 2022; while acute undernutrition (wasting) has been halved to the current 6%[18]. Among adult women of reproductive age, anaemia rates have declined from about 60% in 2008 to 41% in 2022. The current anemia rate among children under five years of age is 49%[18]. The rates are higher in rural areas (56% among children and 51% among pregnant women). Although in decline, the current rates of anaemia in both women and children under-5 remain unacceptably high.

Overweight and obesity rates among adult women have skyrocketed from 10% in 1993 to 50% in 2022[18]. The rates are higher in urban areas where the food environments are rapidly changing. There is a relatively low but increasing rate of obesity among children aged<5 years (2%)[18]. Relative to the DHS data, other small-scall local studies report very high prevalence of overweight/ obesity among children and adults. Ranging from 17% among children aged 9–15 years old and living in urban Ghana[19] 16% to 46% - for children, and 25% to 47% for adults[20, 21].

Ghana's diet quality indicators reveal a complex picture, with urbanization driving dietary transitions toward more processed and calorie-dense foods. Minimum Dietary Diversity for Women (MDD-W) is low at 44% - meaning more than half do not consume a sufficiently varied diet. Also, 98% of the population consumes at least one starchy staple daily; 86% consume at least one vegetable daily; 46% consume at least one fruit daily, suggesting a need to increase fruit intake. 44% include pulses, nuts, or seeds in their daily diet, and 85% consume at least one animal-source food daily. Worryingly, unhealthy food consumption practices

are prevalent with 47% consuming sweet beverages daily, 18% consuming soft drinks, 34% consuming salty or fried snacks, and 26% have deep-fried foods daily[22].

A review on diet-related NCDs and population dietary intake in Ghana by Kipo[23] synthesized evidence from 175 studies involving 123,078 participants. The findings indicated an imbalanced dietary intake, characterized by high consumption of unhealthy nutrients alongside gaps in micronutrient adequacy. Although average protein intake (59.2 g/day) was broadly adequate relative to WHO recommendations, fat intake (105.25 g/day) substantially exceeded advised limits, with a large proportion coming from saturated and trans fats.

Carbohydrate intake (2,770.8 kcal/day), together with excessive consumption of refined sugars, far exceeded WHO thresholds for healthy energy and free sugar intake, thereby increasing the risk of obesity and diabetes. Sodium intake also exceeded WHO recommendations by 8.3 g/day, reflecting a heavy reliance on processed and street foods and aligning with the high prevalence of hypertension observed.

Despite excessive overall energy intake, micronutrient adequacy remained poor. Only 34% of street foods met iron recommendations, and consumption of vitamin A–rich foods was uneven[23]. Collectively, these findings highlight a significant imbalance between excess harmful nutrients and insufficient micronutrient quality, underscoring a clear divergence from WHO guidelines and a classic double burden of malnutrition driving diet-related NCDs in Ghana.

These trends are influenced by both structural and personal drivers including economic growth, urbanization, unhealthy urban food environments, dominated by highly processed foods, limited nutrition and health literacy, and high cost of nutritious foods such as fruits, vegetables, and legumes. A recent analysis of Ghana's soft drinks market reinforces this pattern. The Ghanaian soft drink market value/volume was estimated to be about 1.9 billion liters or $2.17 billion of USD in 2021. In the same year, the per capita consumption was estimated to be 51.2 liters and per capita expenditure, $67.2 USD[24]. Local studies have previously reported widespread availability[25] and heavy marketing/celebrity-endorsed advertisements of SSBs[26]. In 2022, a national survey involving 7,794 residents Ghana revealed that, 33% of Ghanaians drink sugar sweetened beverages (SSBs) multiple times a week; >10% of the respondents reported drinking SSBs multiple times a day; nearly 30% of them drink two or more 330mL cans of SSBs at a sitting[27].

Also, Ghana is currently experiencing early exposure of children to sentinel unhealthy foods. Data from the 2022 Ghana Demographic and Health Survey (DHS) indicate that over 30% of infants and young children aged 6–23 months consume sweetened beverages [18], a trend consistent with global patterns recently documented by Popkin and Laar [28] have recently observed across the globe. Such practices contribute to increased morbidity and mortality.

In summary, Ghana´s public health nutrition landscape reflects diets heavily reliant on starchy staples, with insufficient fruit and pulse consumption, coupled with a notable intake of sugary and fried foods [29]. This dietary pattern contributes to the dual burden of malnutrition, where obesity coexists with stunting and micronutrient deficiencies. Improving Ghana´s food environments and preventing the persistent undernutrition which now coexists with the rising prevalence of overweight, obesity and other diet-related NCDs, is a priority for Ghana[30-33]. The Ghana NPS and food-based policies and interventions respond to this need.

1.1.3. Food and nutrition policy context:

Since 1957, there has been demonstrated political commitments to address malnutrition, particularly food insecurity and undernutrition. National efforts have included the development of various legislations, regulations, policies, strategies and programmes[31, 34]. However, existing food and nutrition policies inadequately regulate food labeling, marketing, provisioning, and accessibility, allowing unhealthy consumption patterns to persist. Historically, food policy in Ghana, has prioritized economic considerations, such as facilitating trade and supporting local industry, with less emphasis on public health outcomes [31, 35]. This imbalance leaves a gap in addressing diet-related health challenges.

In Ghana, significant efforts to address nutrition-related NCDs did not begin until the past decade. The Public Health Act (2012), which was promulgated in 2012, provided a legal framework for several public health interventions, including measures to prevent and control non-communicable diseases (NCDs). In the same year, the Ministry of Health (MOH) published the first-ever National NCDs Policy and accompanying strategy[36], marking a critical step toward addressing the growing burden of diet-related diseases in Ghana. The 2022 version of the policy refers to interventions (including regulating advertisement of unhealthy foods and non-alcoholic beverages, particularly to children), limiting the level of trans fats and salt in industrially processed food as well as food-related health taxes[37]. Other ministries, departments and agencies (MDAs) have shown their support to addressing the problem of NCDs and the Ghanaian food systems as a whole. For instance, in 2019, an inter-ministerial dialogue produced a government 'consensus statement' that acknowledged the value of improving the Ghanaian food environments and food systems to deliver healthy diets and better nutrition. The Dialogue called for a paradigm shift that repositions the Ghanaian food systems from **'feeding" the population to 'nourishing"** them[38]. In 2021, Ghana, expressed commitment to transforming its food systems by 2030, to assure sustainable healthy diets. Among several targets to be achieved, are **development and implementation of food-based dietary guidelines by 2022; updating and consolidating local food composition databases; and development of a nutrient profiling system to facilitate implementation of several food-based policies)**. Accordingly, the development of the Ghana NPS is consistent with, and instrumental to, the country's commitments to food systems transformation. The NPS will serve as a foundational mechanism for operationalizing food-based policies and related regulatory interventions.

1.2. Healthy diets

A healthy diet is essential for achieving and maintaining optimal health. It plays a pivotal role in combating malnutrition in all its forms, including undernutrition, micronutrient deficiencies, and the onset of diet-related chronic diseases such as obesity, cardiovascular diseases, diabetes, and certain cancers.

While the specific composition of a healthy, balanced, and diversified diet varies based on several factors including age, gender, lifestyle, physiological state, physical activity, cultural context, locally available foods, and dietary

customs, there is broad agreement that a healthy diet promotes health and prevents disease. Thus, any diet that promotes growth and development, and prevents malnutrition in all its forms could be considered healthy[4].

Notwithstanding the individual and structural level variables that need to be taken into account, the main subconstructs of healthy diets according to experts[39, 40] include:

- **Nutrient adequacy:** sufficient quantity and quality of nutrient intake compared with nutrient requirements to meet dietary needs, without excess.
- **Nutrient density:** amount or relative proportion of nutrients per weight of food, per unit of energy (often 100 kcal), or per serving.
- **Macronutrient balance:** balance of energy-yielding macronutrients: carbohydrates, proteins and fats.
- **Diversity:** diets composed of a variety of foods derived from diverse food groups.
- **Moderation:** limited intake of foods related to chronic diseases, including refined grains, red and processed meats, and sugar-sweetened foods and beverages.
- **Food safety:** foods are free of microbial pathogens, foodborne macro-parasites, toxins and chemicals.

Accordingly, the WHO identifies the attributes of a healthy diet to include:

- Adequacy and diversity - adequate intake of essential macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins, minerals).
- A variety of fruits, vegetables, whole grains, legumes, and nuts as core components.
- A reduced consumption of harmful substances - limiting the intake of trans fats, saturated fats, added sugars, and sodium, which are linked to chronic disease risks.
- Energy balance - a healthy diet aligns energy intake with energy expenditure to maintain a healthy weight, addressing risks associated with both undernutrition and obesity.
- Food sourcing - foods sourced from environmentally sustainable practices support both individual health and planetary well-being, a growing consideration in global dietary guidelines, is sustainable healthy diets[4].

To guide healthy eating, the WHO Population Nutrient Intake Goals and recent guidelines provide scientifically validated benchmarks, ensuring diets promote health and prevent disease[41].

1.3. Nutrient profiling models and systems

The WHO defines nutrient profiling as **"the science of classifying foods according to their nutritional composition for reasons related to preventing disease and promoting health"**[6, 15]. NPMs are a specific set of rules or algorithm developed to facilitate the classification of the foods.

Nutrient profiling systems, on the other hand are a broader framework or platform that includes one or more nutrient profiling models, scoring systems, thresholds, validation approaches, and their application in policy interventions including implementation strategies, communication tools, and

guidelines for use. As many nutrient profiling systems now include other characteristics such as food ingredients, diet components, food additives, and level of processing, calls exist for a change in nomenclature – from nutrient profiling models to **"food rating systems"**[42].

Currently, various ways of profiling food as **"healthy or unhealthy"** exist[7, 43-45]. Although existing NPMs vary in complexity and detail, profiling methods generally fall into two broad categories:

- a threshold approach, which uses thresholds of specified nutrients (components targeted for restriction); and
- a scoring system, which consists in creating a score from a combination of thresholds for different nutrients.

In the first case, each nutrient is analysed individually in relation to its threshold and the decision on restriction is based on each nutrient taken individually. If one or more of the target nutrients is above the defined threshold, policy or regular lever may be pulled. In the scoring system, points based on the content of each of the target nutrients are assigned and summed to obtain the total score. A policy or a regulatory decision will depend on the summed-up value or cut-offs of the score.

A hybrid system where thresholding is applied to the score generated by the NPS or a combination of a thresholding approach and a continuous scoring system is possible. The Ghana NPS applies this hybrid approach – leveraging a dual system that provides hard stops on foods that exceed critical nutrient thresholds (triggering mandatory warnings), and a continuous scoring to guide general diet quality promotion.

1.4. The Ghana double-duty nutrient profiling system

Currently, several nutrient profiling systems exist and vary in complexity, detail and application[13, 46-49]. The decision to adopt, adapt, or develop one anew is influenced by many factors. One of the cardinal contextual factors is the peculiar heterogeneity of national food environments and their variegated political economies. Facing a syndemic of undernutrition (including multiple micronutrient deficiencies), overweight, obesity and other diet-related NCDs, implementing interventions that focus exclusively on dis-incentivizing the consumption of unhealthy (high-in sugar, calories, salt, fats) foods is necessary but not sufficient[50].

To respond to the complex malnutrition landscape in Ghana, there must be policy interventions that avail healthy foods or facilitate their access; policies that inform and empower; guide and influence or incentivize food actors to act healthfully within their food environments. Accordingly, the Ghana NPS and the policies it seeks to underpin embody the double-duty philosophy of the Healthier Diets for Healthy Lives Project. The design of the NPS considers nutrients and food components of public health concern whose intake needs to be discouraged as well as those whose intake need to be encouraged (see section 2.3 of this document).

1.4.1. Purpose of the Ghana NPS

The principal aim of the Ghana NPS is to facilitate the classification, ranking, or categorization of foods (as unhealthy, less healthy, healthy, or healthier). Further, the NPS will facilitate the development and implementation of policies such as front of pack labelling – comprising mandatory warning labels, and positive logos; marketing regulations – restricting the marketing of designated foods, or counter marketing of healthier foods, food-related fiscal policy (tax policy to limit consumption of unhealthy foods or targeted subsidies to make healthier food attractive and accessible; public food procurement and service policies – that prioritizes healthier foods in public food procurement and provisioning decisions. Other uses such as facilitating the development of benchmarks, nutrition guidelines and standards for foods sold in school cafeterias and other public institutions are possible upon appropriate testing and validation.

1.4.2. Target population

The target population for application of the Ghana NPS includes adults (of all ages), children and adolescents, aged 2 to 19 years. The range excludes the first 1000 days which are covered by the International Code of Marketing of Breast-milk Substitutes[51, 52] and other WHO strategy documents.

1.4.3. Key Principles and rationale for the GNPS

The principles and processes applied in the development and implementation of Ghana's Nutrition Profile Strategy (NPS) draw on existing WHO guidelines[7]. The adapted principles, which consider Ghana´s context and needs, were affirmed at the first meeting of a Multi-stakeholder Technical Task Team (M3T) of the HD4HL Project convened by the Ministry of Health.

One of the overarching principles is the philosophy of **"double-dutyness"**, which means the NPS should have the ability to guide policy measures responding to malnutrition in all its forms. Its design should consider nutrients and food components of public health concern whose intake needs to be discouraged as well as those whose intake need to be encouraged. To be dictated by evidence, these guiding principles outlined below may be updated.

- **Principle 1:** Context-specific, evidence-driven and aligned to local public health and nutrition context
- **Principle 2:** Government-led, government-owned, with requisite technical backstopping from independent thought leaders without financial conflict of interest.
- **Principle 3:** A single government-mandated national nutrient profiling system.
- **Principle 4:** Requirements for mandatory nutrient declarations, guided by the requisite contextual, political, economic and legal feasibility analyses.
- **Principle 5:** Permit evidence-informed continued improvements or adjustments of the NPS.
- **Principle 6:** Exhibit transparency, accessibility and inclusivity (to the extent ethical) in the development of the aims, scope, principles, development and application of the NPS.
- **Principle 7:** The NPS should have double-duty attributes – it should have the ability to guide policy measures to respond to malnutrition in all its forms.

Its design should consider nutrients and food components whose intake need to be discouraged as well as those whose intake need to be encouraged.

» **Principle 8:** The NPS should promote healthier diets, enhance nutrition, and support sustainability.

» **Principle 9:** The NPS once applied in policies such as FOPL should be accessible e.g. interpretive (based on symbols, colors, or quantifiable elements) and understandable to all population subgroups

» **Principle 10:** The processes should leverage meaningful, sufficient, and ethical engagement with relevant food systems actors/ stakeholders as per national laws

02

DEVELOPMENT OF THE GHANA DOUBLE-DUTY NPS

2. DEVELOPMENT OF THE GHANA DOUBLE-DUTY NPS

2.1. The processes adopted in developing the Ghana NPS

The term **"Process",** as used here refers to both political, administrative and technical processes. The Ghana NPS was developed by the Government of Ghana to facilitate efforts to improve food environments and promote healthy diets. First, a framework for the development, implementation, monitoring and evaluation[53] was drafted and validated via a transparent and inclusive process. These processes are summarized below.

2.1.1. Governance

The development of the NPS was government-led, evidenced-informed, transparent, inclusive, and as accessible as ethically appropriate. Early in its development, a process to identify and manage potential unintended consequences was instituted. Aware that if not managed, these could undermine the credibility of the NPS, the HD4HL Project commissioned an intervention to address corporate political activity and conflict of interest in public health policy processes in Ghana[54].

2.1.2. Development

As with local government policy development process, and scientific guidance, the development of the Ghana NPS was deliberative and iterative. The MOH constituted the M3T who subsequently deliberated and approved the aims, scope and principles of the NPS. The development process is organized into the five core steps. These steps which are presented below are not necessarily linear. There was consensus that sufficient flexibility and feedback looping were integral to the process.

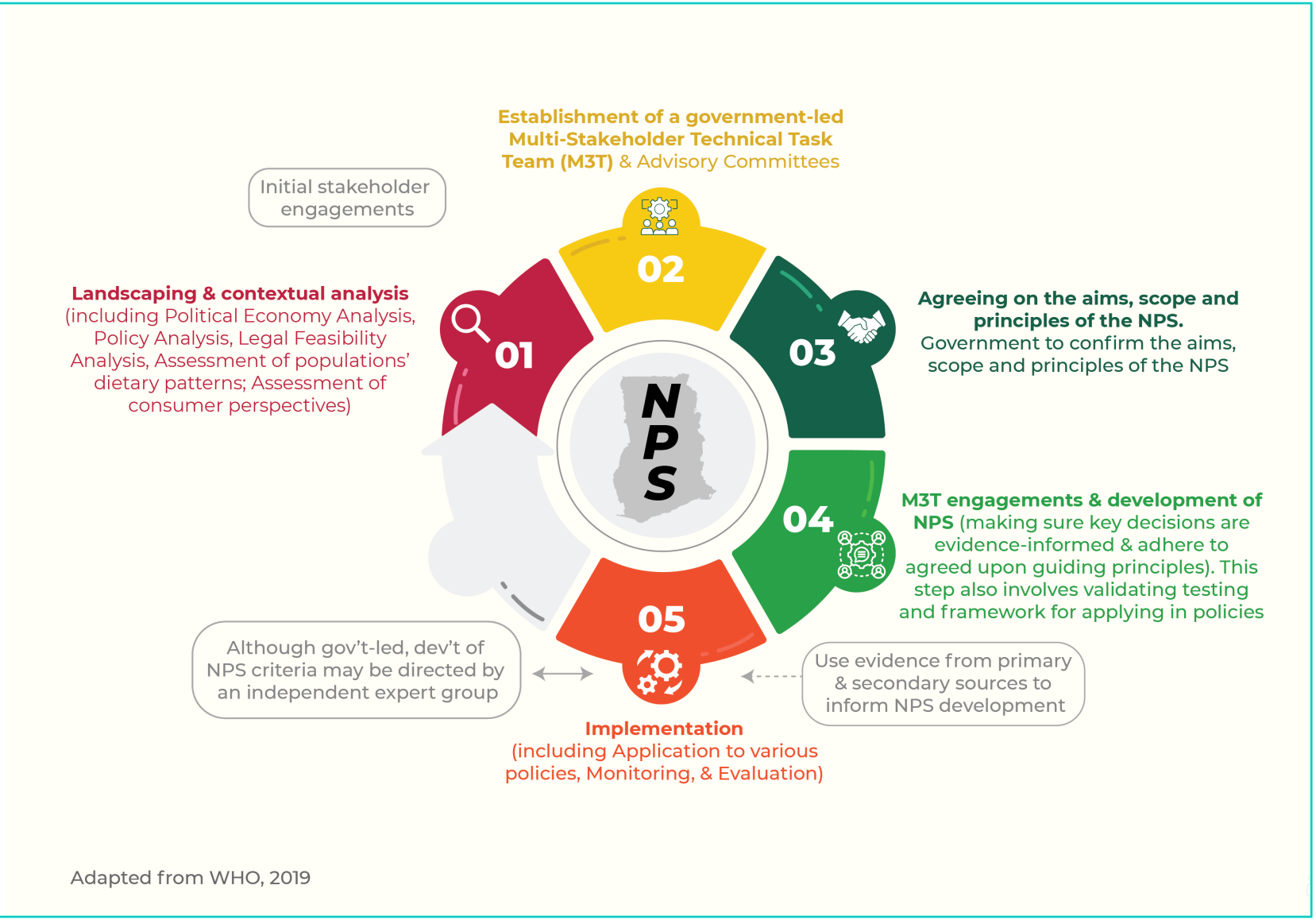


Fig1. Steps in the development and implementation of the Ghana NPS

2.1.3. Landscaping and contextual analysis

To furnish the M3T with the requisite local evidence and context, several operating guidelines, evidence syntheses and contextual analyses were commissioned by the HD4HL project (see Box 1). These included political economy analysis[55]; legal feasibility analysis[56]; policy coherence analysis[57]; a desk review of diet-related NCDs and the population's dietary patterns[23]; baseline assessment of consumer perspectives including consumer understanding and use of the NPS-associated policies[27].

Box 1. Operating guidelines, landscaping and contextual analyses commissioned by the HD4HL Project.

1. A framework, rationale and operating guidelines for the development of the Ghana NPS
2. Identifying potentially relevant nutrient profiling models for consideration by the HD4HL Nutrient Profiling sub-committee
3. Developing a double-duty food-based policy bundle to address malnutrition in all its forms: Lessons from Ghana
4. The role of local food composition data in developing fit-for-purpose nutrient profiling models
5. A review of literature on diet-related NCDs and population dietary intake in Ghana
6. A review of front-of-pack labelling initiatives to guide labelling policy and regulation in Africa
7. A review to build evidence base for food marketing regulations in Africa
8. Analysis of Ghana's food-related policies for coherence and double-duty action
9. Unlocking legal pathways for nutrient profiling and food labelling/marketing regulation in Ghana: a legal feasibility analysis
10. The political economy of food-based policy reforms in Ghana
11. Economic modelling study on the potential impact of SSB taxes on type 2 diabetes and healthcare cost
12. Public support and perspectives on the taxation of sugar-sweetened beverages
13. Designing gender-responsive double-duty food policies to tackle diet-related non-communicable diseases in Ghana

2.1.4. Establishment of a government-led Multi-Stakeholder Technical Task Team (M3T)

Convened by the MOH and co-Chaired by the Ghana Food and Drugs Authority (FDA), and the University of Ghana School of Public Health, the task team provided oversight over the political and technical processes. Many different groups of stakeholders have interest in the development and implementation of NPS. To adhere to the principle of multi-stakeholder inclusivity (as required by national public policy development guidelines), all relevant stakeholders needed to be meaningfully, sufficiently, and ethically engaged

(see full list of members of the NPS M3T and their level of engagement in Appendix 1). However, to ensure that such engagements were insulated from undue influence of corporate actors with vested interest, engagement guardrails were instituted (see details in[54]. We examined current debates on managing CPA and COI and applied existing frameworks and best practices. The WHO´s tools for addressing and managing conflicts of interest during such processes was consulted ([58]; see Fig2).

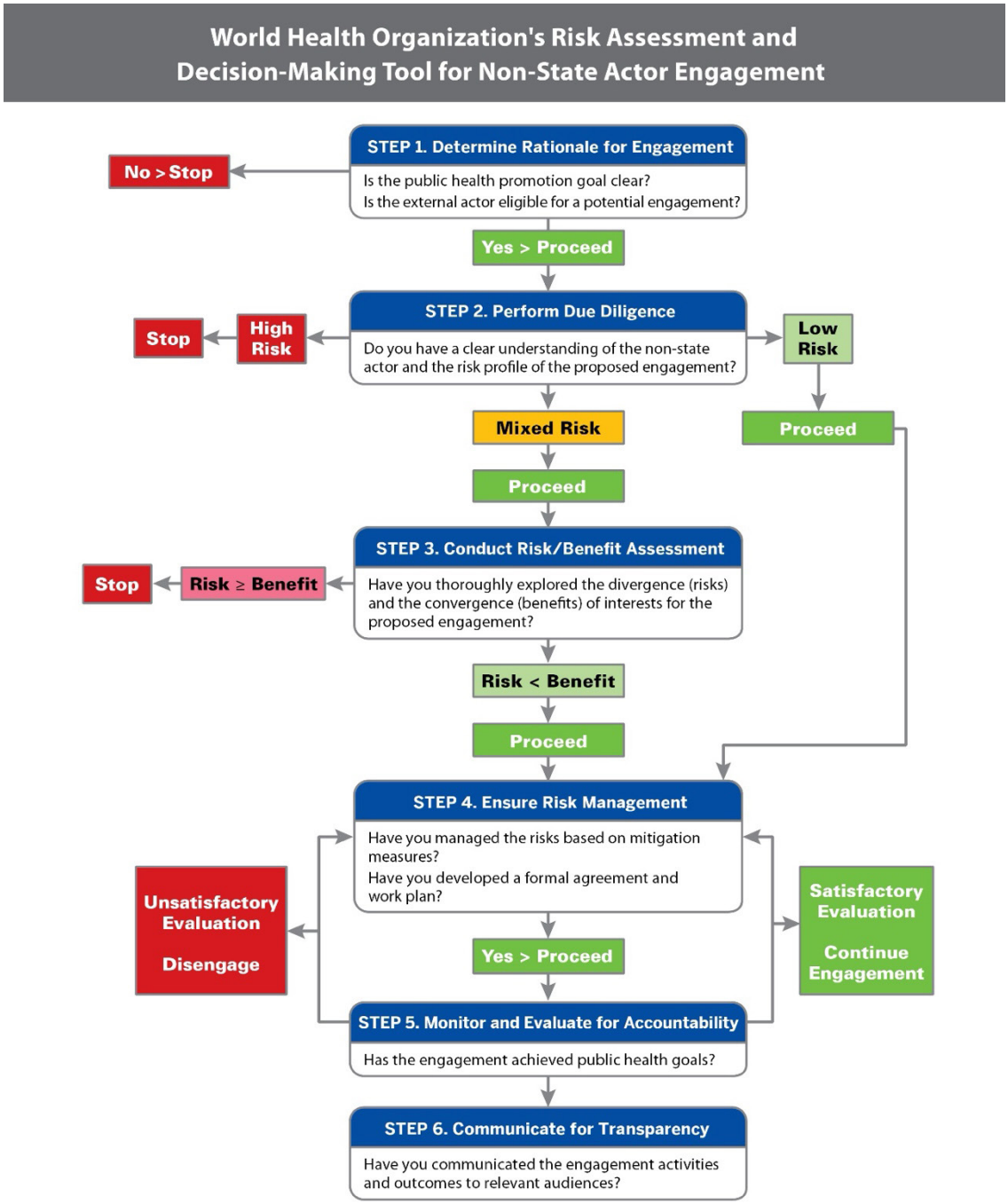


Fig2 WHO Process for Risk Assessment and Decision-Making Tool

Source: Kraak, 2022[59]. Adapted from the WHO's Risk-Assessment Tool for States to Guide Engagement with Non-State Actors to Address Malnutrition in All Forms. Adapted from WHO[58].

2.1.5. Identifying potentially relevant nutrient profiling models (NPMs) for consideration by the Ghana NPS sub-committee.

One of the first tasks of the M3T, was to agree on the aims, scope and principles of the NPS. Those initial conversations covered the pros and cons of adopting, adapting, or developing anew the Ghana NPS. The M3T deliberated on these and eventually agreed that it would be expedient to adapt an existing NPM (to suit Ghana's needs). To identify which of the over 100 NPMs in existence could be adapted, a review was commissioned to identify and assess existing nutrient profiling models (see details in Box 1 and in Laar et al[60]). The review report suggested, with justifications, top three NPMs that could be consideration for adaptation by the M3T. The Box below summarizes the process employed in the NPM selection exercise.

Box 1. Identifying potentially relevant nutrient profiling models (NPMs) for consideration by the HD4HL Nutrient Profiling sub-committee

Background

The Healthy Diets for Healthy Lives (HD4HL) Project was established to support the Government of Ghana in the development of a national Nutrient Profiling Model (NPM). As part of this mandate, the HD4HL Nutrient Profiling sub-committee undertook a structured and transparent process to identify potentially relevant NPMs for consideration in the development of a Ghana-specific, double-duty Nutrient Profiling System (NPS), capable of facilitating policies that address both undernutrition and diet-related non-communicable diseases.

Identification and screening of candidate NPMs

The identification process was informed by three recent systematic reviews of NPMs [13, 61, 62], which collectively identified 133 distinct models. Supplementary searches conducted by the HD4HL Project team identified two additional, more recent models, resulting in a total of 135 NPMs eligible for screening. Two members of the HD4HL Project team independently assessed all identified NPMs against predefined inclusion and exclusion criteria.

Key screening criteria for selecting NPMs included:

(i) applicability to the general population (children and/or adults);
(ii) a double-duty design, incorporating both nutrients to limit (eg sugars, sodium, saturated fats) and nutrients or food components to encourage;
(iii) avoidance of duplication by retaining only one model per shared algorithmic "family";
(iv) transparency, including public availability or accessibility of the model algorithm; and
(v) the ability to generate a numerical score (continuous variable), as well as thresholds, to support policy flexibility and innovation.

Results of the screening process

Initial screening prioritized identification of double-duty NPMs. Of the 135 NPMs screened, 35 met the double-duty criterion. After removal of duplicates, 16 unique models remained for detailed assessment. Eleven of these were excluded for reasons including overlap in model genealogy, lack of numerical scoring outputs, or concerns regarding transparency (see Laar et al[60] for details). Five of these NPMs were retained for full data extraction and comparison: the Health Star Rating (Australia)[63], Nutri-Score (France)[64], the Nutrient-Rich Food Index (NRF9.3)[65], the Food Compass Score (FCS)[66], and the Choices 5-Level Criteria[67]. Following engagements with developers of these NPMs, the HD4HL sub-M3T, and other stakeholders, the WHO Nutrient Profile Model[15], although not considered a double-duty model, was also shortlisted due to its relevance in providing nutrient-specific thresholds required for the Ghana NPS.

Among the shortlisted models, the Food Compass Score emerged as a particularly promising candidate due to its double-duty design, broad inclusion of nutrients and food attributes, and generation of a continuous score adaptable across multiple policy applications. However, its limitation in providing nutrient-specific thresholds led to the consolidation of key elements from both the Food Compass Score and the WHO NPM in the development of the Ghana Double-Duty Nutrient Profiling System..

Among the shortlisted models, the Food Compass Score emerged as a particularly promising candidate due to its double-duty design, broad inclusion of nutrients and food attributes, and generation of a continuous score adaptable across multiple policy applications. However, its limitation in providing nutrient-specific thresholds led to the consolidation of key elements from both the Food Compass Score and the WHO NPM in the development of the Ghana Double-Duty Nutrient Profiling System.

2.2. Adapting the WHO and the Food Compass NPMs to the Ghana NPS

This section summarizes the processes applied to adapt the WHO NPM and the Food Compass NPM to the Ghana NPS. These adaptations were preceded by a compilation of local food composition data; itself a multi-step process. An up-to-date and a reliable local food composition data is a prerequisite for developing a fit-for-local purpose nutrient profiling system. The HD4HL project embarked on a compilation of available food composition data for foods and beverages in Ghana. The process identified the Ghana Food Composition Table developed in 1975[68], and a food composition database - the RIING Database - developed by researchers from the University of Ghana. The RIING database contains composition of local mixed dishes (n = 303). Further, the West Africa Food Composition Table (WAFCT), developed in 2012 and updated in 2019[69], was identified. Containing mainly unprocessed and minimally processed foods (n = 908), the WAFCT foods also contains composition of all the Ghanaian foods included in the 1983 edition of the Food Composition Table. Given that these databases did not contain many processed / branded food products, a decision was made to compile food composition data for prepackaged foods in

Ghana. Two approaches were adopted as outlined below.

One approach was to compile food composition data from a **"Photo Repository of Prepackaged Food Products"** maintained by the Ghana FDA. The FDA compiles food photos as part of product registration and also routinely conducts market surveillance to oversee the safety and legality of food products available in Ghanaian markets, during which food products are sampled. The FDA granted access to photos of food products - approximately 30,000 photos of packages of food products. The process of data extraction involved reviewing the photos associated with a product and extracting the relevant information using an online spreadsheet. However, due to its labor-intensive nature, the approach was paused after yielding food composition data of 2,240 unique food products.

The other approach was field data collection for additional prepackaged food products. A nationwide field data collection exercise was conducted from July to November 2024. The exercise was jointly led by the University of Ghana and the FDA, with input from UCAD, Senegal, and the University of Western Cape, South Africa. The field data collection involved visiting food outlets (i.e. supermarkets, convenience/provision shops, and open markets) in six regions of Ghana (Greater Accra, Volta, Ashanti, Western, Northern, Central). The data collected included retail store information, GPS, food package photos (including principal display panel, back of pack, top and bottom of the pre-package food products), portion size in reported units, nutrition information, claims as well as the position of the information on the product package. A total of 9,726 unique food products were captured during the field data collection. Of these, 6,639 contained relevant nutrition information (a total 3,087 did not).

The three approaches yielded data on a total of 10,090 food products.

- RIING (n =303)
- WAFCT (n =908)
- HD4HL Photo Recovery and Field Survey exercises (n =8,879)

The data obtained from the approaches outlined above, underwent various stages of cleaning and curatorial management to ensure completeness, consistency and uniformity in the presentation. Each food was eventually assigned a NOVA food category, and adapted WHO Afro Nutrient Profiling Model Category, and an adapted Food Compass score.

2.2.1. Adapting the WHO NPM to the Ghana NPS: The process

In adapting the WHO NPM and incorporation into the Ghana NPS, the following modifications and additions were made. The team:

- condensed the original 18 food categories in the WHO NPM into seven (7) categories
- deprioritized total fats, and added sugars from nutrient thresholds
- modified an existing food category into minimally processed plants and proteins – comprising unprocessed or minimally processed fruits, vegetables and pulses plus fresh meats, poultry, fish), and
- introduced a new threshold based on presence of food additives such as non-nutritive sweeteners/non-caloric sweeteners/non-sugar sweeteners, and level of processing

The consolidation of the 18 food categories to seven (7), was undertaken to streamline

the process, improve regulatory efficiency, and enable consistent application of nutrient thresholds, especially for key nutrients of concern such as total sugars, saturated fats, and sodium. In grouping foods, the guiding principle was to ensure that each new category contains nutritionally and functionally similar products so that a single set of nutrient criteria can be fairly applied. Foods with fundamentally different nutritional profiles or consumption contexts were deliberately kept separate; for example, solids were not mixed with liquids, and indulgent sweet products were not grouped with staple or savory foods (see details in Table 1). The key guiding principles and considerations in condensing 18 food categories to 7 are summarized in Box 3 and Table 1.

Box 3 Guiding principles in food category consolidation

1. **Nutrient threshold consistency**: Each category retains thresholds that reflect the typical nutrient composition of its component foods. For example, all beverages use sugar thresholds per 100 mL, while solids are assessed per 100 g..
2. **Matrix integrity**: Distinct food matrices such as liquids, solids, and semi-solids are not merged, preventing distortion of cutoffs. For instance, processed meats, characterized by high sodium and fat, remain separate from fresh meats or plant-based staples.
3. **Regulatory compatibility**: The refined categories generally align with other practices in nutrient profiling, such as those used in the WHO NPM for the Africa region, Kenya, and South Africa NPMs - facilitating benchmarking and harmonization.
4. **Contextual functionality**: Foods are grouped with consideration to their typical consumption context – in the Ghanaian context - meals, snacks, or drinks, to support intuitive interpretation by consumers.

Table 1. The Ghana NPS food categories

Food Group	Food categories	Cardinal nutrient of interest	NOVA Screening	Food additives/ NSS	Ghana NPS food category justification	Matching WHO NPM food categories
Group 1 - Beverages (includes liquid foods and drinks) Thresholds (100g/mL)	1a. Juices (e.g. 100% fruit/ vegetable juice)	Total sugar (per 100 mL)	Yes, applicable – NOVA 4 products may include sodas, sweetened juices, cereals, etc	Yes, applicable. NSS may be added to these foods	Separate category due to unique liquid nutrient thresholds. Ultra-processed beverages (sweetened, carbonated) are flagged. Encompasses all non-alcoholic drinks. Separate treatment is essential due to different measurement unit (per 100 mL) and sugar concerns.	6a. Juices (e.g. 100% fruit/ vegetable juice)
	1b. Plain Milk and dairy-based drinks					6b. Milk and dairy-based drinks
	1c. Water-based drinks (soft drinks, flavored water, powdered drinks)					6c. Water-based drinks (soft drinks, flavored water, powdered drinks)
	1d. Coffee, tea, herbal infusions					6d. Coffee, tea, herbal infusions
	1e. Cereal, legumes, tree nut-based beverages					**6e. Cereal, legumes, tree nut-based beverages**
Group 2 - Sweet Foods (includes Chocolates, candies, sweet baked goods (eg cakes, pastries), ice cream, sweet spreads etc Threshold (per 100g)	2a. Chocolate, confectionery, energy bars, sweet toppings	Total sugar, saturated fat (per 100g)	Yes, applicable – NOVA 4 products may include confectionery, bakery products	Yes, applicable. NSS may be added to these foods	Consolidates indulgent high-sugar solids (e.g., candy, pastries, ice cream) under one threshold set. Ultra-processed sweet products face additional restrictions. Includes confectionery, baked goods, and frozen desserts. All are sugar-dense, indulgent foods	1. Chocolate, confectionery, energy bars, sweet toppings
	2b. Cakes, pastries, sweet bakery products					2. Cakes, pastries, sweet bakery products
	2c. Frozen dairy desserts and edible ices					7. Frozen dairy desserts and edible ices
	2d Other dairy-based desserts					8. Other dairy-based desserts

Food Group	Food categories	Cardinal nutrient of interest	NOVA Screening	Food additives/ NSS	Ghana NPS food category justification	Matching WHO NPM food categories
Group 3 - Savory Snacks and processed foods (include savory snacks (crisps, chips), processed meats/fish, sauces/ dressings, meat analogues Threshold (per 100g)	3a. Ready-to-eat savory snacks	Sodium, saturated fat (per 100g)	Yes, applicable – NOVA 4 products may include crisps, processed meats, sauces	No, not, applicable. NSS are usually not added to these foods	Consolidates discretionary, high-sodium processed foods. Combines high-sodium and high-fat processed foods -snacks, meat analogues, sauces -with similar discretionary profiles. Common cut-offs for salt and fat apply; NOVA 4 triggers additional controls.	5. Ready-to-eat savory snacks
	3b Processed meat, poultry, fish					14. Processed meat, poultry, fish
	3c. Solid-form soybean products (e.g. tofu)					17. Solid-form soybean products (e.g. tofu, TVP)
	3d. Sauces, dips, dressings					18. Sauces, dips, dressings
Group 4 - Composite/ Prepared Meals (includes ready to eat meals, pizzas, mixed dishes, filled pastries, sandwiches) Multi-nutrient thresholds (FSS) per 100g)	4a Composite foods (e.g., ready meals, filled pastries, sandwiches)	Salt, fat, sugar (multi-nutrient) (per 100g)	Yes, applicable – NOVA 4 products may include some ready-to-eat meals	Yes, applicable. NSS may be added to some of these foods	Multi-ingredient meals (eg pizzas, waakyes, sandwiches) require composite thresholds. Maintained as a distinct category for practical and regulatory coherence Maintains multi-nutrient thresholds for mixed dishes like pizza, sandwiches. Once it is ultra-processed, it is flagged regardless of nutrient profile.	10. Composite foods (e.g., ready meals, filled pastries, sandwiches)

Food Group	Food categories	Cardinal nutrient of interest	NOVA Screening	Food additives/ NSS	Ghana NPS food category justification	Matching WHO NPM food categories
Group 5 - Dairy, Dairy Analogues and Oils (includes Cheese, yogurt, sour cream, dairy-based or plant-based alternatives) Threshold (per 100g)	5a Cheese and analogues	Saturated fat, sodium (per 100g)	Yes, applicable – NOVA 4 products may include some flavored yogurts, dairy desserts	Yes, applicable. NSS may be added to some of these foods	Includes cheese, sour cream, plant-based analogues. Maintained separately due to high fat and salt profiles unique to the dairy matrix. NOVA-based screening distinguishes plain vs. flavored/ processed variants.	9. Cheese and analogues
	5b Butter, margarine, oils and fat emulsions					11. Butter, margarine, oils and fat emulsions
Group 6 - Staple Grains, Cereals, and other flour products (includes breads, cereals, pasta, rice, flours) Threshold (per 100g)	6a Breads and crisp breads	Sodium, total sugar (per 100g)	Yes, applicable – NOVA 4 products may include breakfast cereals, flavored pasta	Yes, applicable. NSS may be added to some of these foods	Includes bread, breakfast cereals, and cooked grains. Their starch-based matrix allows harmonized sugar and sodium thresholds. Processed products flagged based on NOVA 4 classification.	3. Breads and crisp breads
	6b Breakfast cereals					4. Breakfast cereals
	6c Pasta, noodles, rice and grains					12. Pasta, noodles, rice and grains
Group 7 - Fruits, Vegetables, Pulses and other proteins (unprocessed or minimally processed, or processed). Typically, exempt or minimal sodium threshold)	7a Fresh/ frozen meat, fish, poultry, seafood	Typically, exempt or minimal thresholds (per 100g)	No, not applicable – typically NOVA 1–2	No, not, applicable. NSS are usually not added to these foods	Includes whole foods like legumes, fresh or minimally processed meats, and vegetables. Often nutrient-dense and unprocessed and exempt from FOPL under both nutrient and processing criteria	13. Fresh/ frozen meat, fish, poultry, seafood
	7b Fresh/ frozen fruits, vegetables, legumes, roots/tubers					15- Fresh/ frozen fruits, vegetables, legumes, roots/tubers
	7c Processed fruits, vegetables, legumes and pulses					16. Processed fruits, vegetables, legumes & pulses

2.2.2. Adaptation of food compass domains, attributes and framework for scoring foods

The adaptation of the Food Compass parameters (domains and attributes) for the Ghana NPS was conducted through a collaborative approach. The process began with an assessment of the public health landscape, including both national and international dietary guidance. A literature review was undertaken to incorporate insights from existing dietary guidelines, dietary intake patterns, and public health priorities in Ghana[23, 37]. Stakeholder input - from the Ghana NPS development technical committee and the HD4HL Project Advisory Committee helped refine the Food Compass parameters for national application.

The NPS Committee reviewed the attributes and domains of the original Food Compass, drawing on evidence from national policy documents, contextual analysis and reviews conducted under the HD4HL project. To validate the content and prioritize nutrients for scoring, the HD4HL team conducted a rating exercise to identify nutrients or food components to encourage (or to reward points) and nutrients to discourage or penalize within the algorithm. This exercise ensured that the adapted scoring system was aligned with Ghana's public health needs and nutritional priorities.

As part of the adaptation process, certain attributes from the original Food Compass were omitted based on their relevance to the Ghanaian context as well as data availability challenges. Vitamin K and Choline from the Vitamin domain, Copper from the Mineral domain, and the entire Phytochemical domain (including flavonoids and carotenoids) were excluded. In the end, 8 domains and 49 attributes were applied in the Ghana NPS (see Appendix 2).

To test the performance of the adapted Food Compass parameters on local food products, a pilot test was done using a mini food basket (comprising 44 typical products) – a diverse selection of foods commonly consumed in Ghana. This basket included raw (unprocessed) foods, mixed dishes, and processed branded prepackaged foods – selected from the compiled food databases:

- The WAFCT-2019 contributed 24 food items to the mini food basket.
- The RIING Food Database contributed 7 food items to the mini food basket.
- The newly generated HD4HL Database contributed 13 food items to the mini food basket.

The compiled mini food basket was then subjected to pilot scoring using the original Food Compass algorithm. The generated scores for the food products included in the mini food basket were presented to the Ghana NPS committee to interrogate. Queries raised by the committee members were addressed. Ultimately using the 8 domains and 49 attributes, a score for each food (n ~ 6400) was generated. We adapted the 100-point Food Compass score to 10. The Ghana NPS produces nutrient profile scores (NP scores) ranging from 1 (least healthful) to 10 (most healthful).

2.3. Thresholding and validation

This section outlines the various thresholding approaches applied in nutrient profiling systems as well as the methods used to validate the Ghana NPS.

2.3.1. Thresholding

In nutrient profiling, a threshold, or cut-off point, demarcates **"acceptable"** and **"non-acceptable"** food products based on their nutrient composition relative to public health objectives. However, thresholding carries both a technical dimension-setting evidence-based nutrient limits, and a symbolic dimension -signaling to consumers which foods are encouraged or discouraged. Both dimensions are carefully integrated into the design and application of most nutrient profiling systems.

The Ghana NPS applies a dual thresholding strategy, integrating two evidence-based approaches:

nutrient-specific thresholding based on WHO guidelines, and a holistic scoring system adapted from the Food Compass NPM. This dual strategy enables regulatory action that is scientifically rigorous while providing consumers with clear, practical guidance for healthier choices and overall food quality.

2.3.1.1. Nutrient-specific thresholding

The first approach identifies foods and drinks that are **"excessive in"** nutrients or food components of public health concern. These thresholds are derived from the WHO Population Nutrient Intake Goals (PNIGs), the WHO NPM for Africa region, as well as WHO guidelines on carbohydrates, free sugars, sodium, saturated fat, trans-fatty acids, and non-sugar sweeteners. A food product is designated as **"excessive in"** a nutrients or food components, if its composition exceeds the corresponding maximum threshold set in alignment with the guidelines enumerated below. These thresholds reflect the levels beyond which nutrient intake is associated with increased risk of ill-health including diet-related NCDs. Thresholds for nutrients and food components, some of which have been adopted by the Ghana NPS, are presented in Table 2.

Table 2: Existing cut-off points of some specific nutrients or food components

Nutrient \ Food component	Threshold (solids per 100g or liquids per 100mL)[1]	Rationale
Sodium*	1 mg per 1 kcal (ratio) >300mg per 100g	Aligns with WHO recommendation to limit sodium intake to 2000 mg/day with an energy intake of 2000 kcal/day. Emphasis on sodium reduction reaffirmed in WHO 2023 salt substitute guidance.
Free Sugars (Foods)**	≥10% of total energy >10g per 100g	Based on WHO guideline to limit free sugars to <10% of daily energy intake.
Free Sugars (Beverages)***	≥5% of total energy >5g per 100g	Reflects WHO's conditional recommendation to reduce free sugars to <5% of total energy intake.
Total Fat****	≥30% of total energy	Reaffirmed by 2023 WHO guidelines that total fat should not exceed 30% of daily energy intake.
Saturated Fat*****	≥10% of total energy >10g per 100g	Saturated fats limited to less than 10% of total energy to reduce CVD risk, reaffirmed by WHO 2023 guidelines.
Trans-Fatty Acids******	<1% of total energy ≤ 2% of total fat content (equivalent to ≤ 2g of iTFAs per 100g of total fat)	WHO goal to eliminate industrially produced trans-fatty acids. Confirmed in 2023 WHO update.
Non-Sugar Sweeteners (NSS)*******	Any amount per 100g or per 100ml	Updated WHO NSS guideline (2023) advises against NSS use for weight control, applying precautionary principle.

In table 3, the specific cut-off points adopted by the Ghana NPS are presented. The adaptations, or modifications introduced to the Ghana NPS are summarized below.

1 *WHO, 2023a; Use of lower-sodium salt substitutes: WHO guideline. Geneva: World Health Organization; 2025. Licence: CC BY-NC-SA 3.0 IGO https://www.who.int/publications/i/item/9789240105591 & WHO 2012. WHO. Guideline: Sodium intake for adults and children. Geneva, World Health Organization https://www.who.int/publications/i/item/9789241504836

**WHO, 215 Guideline: Sugars intake for adults and children. Geneva: World Health Organization; 2015. https://www.who.int/publications/i/item/9789241549028 & WHO, 2023b Carbohydrate intake for adults and children: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/9789240073593

***Ibid (see 2)

****WHO, 2023c . Total fat intake for the prevention of unhealthy weight gain in adults and children: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/9789240073654

*****WHO, 2023d. Saturated fatty acid and trans-fatty acid intake for adults and children: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO https://www.who.int/publications/i/item/9789240073630

******World Health Organization. (2018). REPLACE: An action package to eliminate industrially-produced trans-fatty acids. WHO. https://www.who.int/teams/nutrition-and-food-safety/replace-trans-fat?utm & WHO, 2023d. Saturated fatty acid and trans-fatty acid intake for adults and children: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO https://www.who.int/publications/i/item/9789240073630

*******WHO, 2023e WHO, 2023e. Use of non-sugar sweeteners: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/9789240073616

Level of processing

A critical innovation in Ghana's adaptation is the integration of food processing level, using the NOVA classification system, as an independent criterion. Products categorized as NOVA 4 (ultra-processed foods) may be automatically subject to regulatory controls (eg FOPL designations), regardless of whether their nutrient content alone would pass or fail traditional thresholds. This dual-criteria approach ensures that the health risks associated with extensive food processing - such as hyper-palatability, food additives, and use of non-food substances are explicitly accounted for.

Total Fat

Total fat is not included as a threshold. The decision to drop total fat from the list of threshold nutrients in Ghana's NPS is scientifically justified based on two main considerations. First, the limited discriminative value of total fat in predicting nutritional quality. Recent evidence shows that total fat as a nutrient lacks specificity in differentiating nutrient-dense, healthy foods (e.g., nuts, avocados, eggs, oily fish) from energy-dense, ultra-processed items high in harmful fats (e.g., chips, pastries). Several studies have shown that total fat alone is a poor indicator of adverse health outcomes when not contextualized by fat quality (i.e., saturated vs. unsaturated fat) and food source [70, 71]. Second, the adoption of processing level (NOVA classification) as an independent risk filter, which captures much of the public health concern previously associated with high-fat foods. NOVA 4 foods often feature reformulated fat blends, emulsifiers, and hyper-palatable profiles associated with overconsumption and metabolic dysfunction[72]. Most high-fat ultra-processed foods will be captured under the NOVA 4 filter and/or exceed saturated fat or sodium thresholds, which remain in the model.

Added Sugar

Added sugar is not included as a threshold. The decision is underpinned by practical, and logistical considerations. In the context of regulatory implementation in low- and middle-income country setting food labels do not specifically indicated added sugars. The measurement and verification of added sugar content pose significant challenges in Ghana's current regulatory and food labeling environment. Unlike total sugar, which is analytically measurable and mandatorily declared on many nutrition labels, added sugar often requires manufacturer disclosure or reformulation records, which are rarely available or verifiable in Ghana's market[73, 74]. As such, using added sugar as a threshold risks regulatory blind spots or creates enforcement gaps. As such, the WHO recommends that where it is practically impossible to use added sugar, total sugar should be used [15].

Table 3. The Ghana NPS food categories and thresholds

Food Group	Ghana NPS food categories	Saturated fat (g)	Total sugars (g)	Sodium (g)	iTFAs[2] or PHOs (g) per 100g of total fat	NSS	Level of processing
Group 1 - Beverages (includes liquid foods and drinks)	1a. Juices (e.g. 100% fruit/ vegetable juice)	**NT**	**6.0**	0.3[3]	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	1b. Plain Milk and dairy-based drinks	**NT**	NT	NT	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	1c. Water-based drinks (soft drinks, flavored water, powdered drinks)	NT	**0.0**	**0.1**	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	1d. Coffee, tea, herbal infusions	NT	**0.0**	**NT**	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	1e. Cereal, legumes, tree nut-based beverages	**NT**	**6.0**	**0.1**	≤ 2g iTFAs or 0% PHOs	**Any amount**	**Ultra processed**
Group 2 - Sweet Foods (includes Chocolates, candies, sweet baked goods (eg cakes, pastries), ice cream, sweet spreads etc	2a. Chocolate, confectionery, energy bars, sweet toppings	NT	**6.0**	**NT**	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	2b. Cakes, pastries, sweet bakery products	NT	**6.0**	0.25	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	2c. Frozen dairy desserts and edible ices	NT	**12.0**	0.10	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	2d Other dairy-based desserts	NT	**6.0**	0.10	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed

2 **Industrial Trans Fatty Acids** (iTFA):≤ 2g per 100 g of total fat. **Partially Hydrogenated Oils** (PHOs): Not permitted (0%) as ingredient

3 As some vegetable juices are made with added salt, the threshold is set to restrict those products with added salt.

Food Group	Ghana NPS food categories	Saturated fat (g)	Total sugars (g)	Sodium (g)	iTFAs[2] or PHOs (g) per 100g of total fat	NSS	Level of processing
Group 3 - Savory Snacks and processed foods (include savory snacks (crisps, chips), processed meats/fish, sauces/ dressings, meat analogues	3a. Ready-to-eat savory snacks	NT	**NT**	**0.25**[4]	≤ 2g	Any amount	Ultra processed
	3b Processed meat, poultry, fish	**3.0**	**NT**	**0.40**	≤ 2g	Any amount	Ultra processed
	3c. Solid-form soybean products (e.g. tofu)	NT	NT	**0.30**	≤ 2g	Any amount	Ultra processed
	3d. Sauces, dips, dressings	NT	NT	**0.30**	≤ 2g	Any amount	Ultra processed
Group 4 - Composite/ Prepared Meals (includes ready to eat meals, pizzas, mixed dishes, filled pastries, sandwiches)	4a Composite foods (e.g., ready meals, filled pastries, sandwiches)	**3.5**	**9.0**	**0.35**	≤ 2g	Any amount	Ultra processed
Group 5 - Dairy, Dairy Analogues and Oils (includes Cheese, yogurt, sour cream, dairy-based or plant-based alternatives)	5a Cheese and analogues	**NT**	**NT**	**0.60**	≤ 2g	Any amount	Ultra processed
	5b Butter, margarine, oils and fat emulsions	35.0	**NT**	0.10	≤ 2g	Any amount	Ultra processed

4 The sodium threshold is double what is allowed based on calculation of 1mg/1kcal to allow for processing needs.

Food Group	Ghana NPS food categories	Saturated fat (g)	Total sugars (g)	Sodium (g)	iTFAs[2] or PHOs (g) per 100g of total fat	NSS	Level of processing
Group 6 - Staple Grains, Cereals, and other flour products (includes breads, cereals, pasta, rice, flours)	6a Breads and crisp breads	NT	**6.0**	**0.25**	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	6b Breakfast cereals	NT	**9.0**	**0.35**	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
	6c Pasta, noodles, rice and grains	NT	NT	**0.25**	≤ 2g iTFAs or 0% PHOs	Any amount	Ultra processed
Group 7 - Fruits, Vegetables, Pulses and other proteins (unprocessed or minimally processed, or processed). Typically, exempt or minimal sodium threshold)	7a Fresh/frozen meat, fish, poultry, seafood	NT	NT	**NT**	NT	NT	NA
	7b Fresh/ frozen fruits, vegetables, legumes, roots/ tubers	NT	NT		NT	NT	NA
	7c Processed fruits, vegetables, legumes and pulses	NT	NT	**0.40**	NT	NT	Ultra processed

NT-No Threshold **NA**-Not Applicable

2.3.1.2. Holistic Food Scoring and thresholds

The second approach complements the above thresholding with a holistic scoring system adapted from the Tufts University Food Compass model. The Ghana NPS evaluates foods across multiple domains to assign a nutrient profile (NP) score between 1 (least healthful) and 10 (most healthful). Classification of foods based on this holistic scoring system gives an idea of the overall healthfulness of the food.

- Foods with scores ≥7.0 are designated as foods to encourage (granted such foods are not designated to bear a front of pack warning label, or do not exceed any of the thresholds referred to above)
- Foods with scores from 3.1–6.9 are designated as foods to consume in moderation
- Foods with scores ≤3.0 are designated as foods to discourage

In practice, a food exceeding a nutrient

threshold would bear a warning label (e.g., "Excessive in Sugar") and likely have a low Ghana NP score reinforcing the health advisory. Conversely, a food scoring in the "Encourage" range would generally be below all nutrient thresholds, making it eligible for promotion, counter marketing, positive logos, or procurement. See Appendix 3B for food scoring guidance.

Together, these tools enable Ghana's NPS to guide the implementation of the bundle of food-based policies as well as offer incentives (negative and positive) that instigate positive change in the food environments.

The distribution of the 6,400 foods in the maiden Ghana NPS food database by various food categories and thresholds are presented in Appendix 4.

2.3.2. Validity testing

To ensure that a NPM accurately classifies foods based on their healthfulness, multiple forms of validity testing were undertaken. These included content, construct (including convergent), and face validity. Plans are also in place to assess criterion and predictive validity. Each type of validity helps confirm that the model's scoring reflects nutritional quality and aligns with public health objectives.

2.3.3. Content validity

A suitable content validity of a nutrient profiling system ensures that the system captures the nutrients, food characteristics, and risk factors that are most relevant to population health and policy objectives. For the Ghana NPS, this meant selecting nutrients and food components that reflect Ghana's public health nutrition priorities and dietary guidelines (eg limiting sugars, sodium, saturated fats, and trans-fats, while encouraging fiber, protein, and essential micronutrients). This focus reflects Ghana's prevailing nutrition challenges, including persistent micronutrient deficiencies alongside rising rates of overweight, obesity, and diet-related noncommunicable diseases.

The development process compiled multiple datasets covering foods commonly consumed in Ghana. Over 10,000 unique foods and beverages were reviewed, spanning unprocessed staples, traditional dishes, and commercially processed products. Eventually approximately 6,400 foods were used in the development of the NPS.

The WHO-AFRO NPM[15], served as the structural foundation for the Ghana NPS, with targeted adaptations to improve contextual relevance and usability. The original 18 WHO food categories were consolidated into seven categories to enhance implementation efficiency. Certain nutrient thresholds were also adjusted to reflect national priorities, for example, the NPS does not have thresholds for total fat, and added sugars – focusing on saturated fatty acids and total sugars. One of its seven food categories is explicitly oriented toward minimally processed staples and nutrient-rich foods (eg fruits, vegetables, legumes, and unprocessed animal-source foods), which generally align with dietary recommendations.

To strengthen content validity beyond nutrient composition alone, the Ghana NPS explicitly incorporates food processing indicators. Using the NOVA classification, ultra-processed foods (NOVA Group 4) are flagged as higher-risk products irrespective of compliance with nutrient cut-offs. This approach captures health risks associated with industrial processing such as refined ingredients, use of additives, and hyper-palatable formulations that are not fully reflected by nutrient metrics alone. Also, the model accounts for selected additives of concern in line with national guidance. Products containing non-sugar sweeteners

receive penalties or specific thresholds, reflecting policies discouraging their substitution for sugar. Other additives, including sodium nitrite and monosodium glutamate (MSG), are also flagged. Integrating processing level and additive presence reduces opportunities for nutrient-based reformulation to mask poor overall food quality. The Ghana's NPS adapted 8 relevant domains, and 49 attributes from the Food Compass NPM[66] – providing a comprehensive coverage of nutrients, ingredients, processing characteristics, and dietary risk factors relevant to Ghana. This multidimensional design supports confidence that the system is scientifically robust, context-appropriate, and fit for regulatory and policy use.

To further assess the contextual relevance and applicability of the Food Compass domains adapted for the Ghana NPS, a pilot assessment was conducted using a mini food basket comprising 44 foods commonly consumed in Ghana, including unprocessed staples, mixed dishes, and pre-packaged products. The basket was scored using the original Food Compass algorithm, with exclusions applied in line with its specifications (foods providing <5 kcal/100 g, single-ingredient items, and infant-specific foods). The resulting scores were reviewed by the Ghana NPS Development subcommittee to evaluate whether the domain-level outputs appropriately reflected expected differences across food types and processing levels. Feedback from this review informed refinements to the adapted domains and attributes used in the Ghana NPS. This pilot application provided an additional check that the selected Food Compass–derived domains collectively captured relevant nutritional, ingredient, and processing-related characteristics of foods consumed in Ghana, thereby strengthening the system's content validity.

2.3.3.1. Face validity

Face validity refers to the extent to which a nutrient profiling system's classifications appear logical, credible, and consistent with expert expectations when applied to real foods. For the Ghana NPS, face validity was assessed through a combination of structured expert review and quantitative agreement analysis, ensuring that model outputs were both intuitively acceptable and empirically defensible.

Initial face validation was undertaken through structured reviews by Ghanaian nutrition experts, who examined initial NPS outputs including food scores and category assignments to assess whether classifications aligned with professional expectations. Additional face validation was conducted through iterative technical review by the M3T technical team and the HD4HL core group during application of the NPS to a comprehensive database of approximately 6,400 food items.

To complement these qualitative assessments, formal inter-rater reliability analysis was conducted to quantify alignment between expert food healthfulness judgements and the Ghana NPS. A subsample of 50 foods was independently rated by 40 experts, who classified each food according to whether consumers should limit, moderate, or encourage its consumption. Expert consensus for each food was defined as the modal category across raters. Ghana NPS similarly flagged foods into the same three ordinal categories to enable direct comparison.

Agreement between expert consensus and NPS classification was assessed using Cohen's Kappa statistics. Given the ordinal nature of the classification scale, quadratic-weighted Cohen's Kappa was computed and prioritised for interpretation. The weighted Kappa indicated moderate-to-substantial

agreement (κ = 0.59), with a 95% bootstrap confidence interval of 0.38 to 0.76, demonstrating statistically robust alignment between expert judgement and the NPS. Overall, exact agreement between expert consensus and the Ghana NPS was observed for 58% of foods, with perfect agreement for foods that experts agreed should be encouraged. Importantly, disagreement patterns were highly structured rather than random: 98% of mismatches involved adjacent categories (limit versus moderate, or moderate versus encourage), while only one food exhibited extreme disagreement (limit versus encourage).

Consistent with the Kappa findings, ordinal association between expert judgement and the Ghana NPS was strong. Spearman's rank correlation between the expert mean ordinal score and the NPS category was ρ = 0.69 ($p < 0.001$), indicating that the model reliably preserves the relative ordering of foods by healthfulness, even where exact categorical agreement is not universal.

Taken together, these findings provide strong evidence of face validity for the Ghana NPS. The model's classifications are intuitive to experts, demonstrate statistically robust agreement beyond chance. Three other validity testing (convergent validity, criterion validity and predictive validity) are either underway or planned for the future.

2.3.3.2. Construct/convergent validity

Construct validity evaluates whether the NPM truly measures the theoretical construct it is intended to measure – in this case, the **"healthiness"** or nutritional quality of foods. A model with high construct validity will categorize foods in a manner consistent with nutrition science theory and public health principles. This was assessed by comparing the Ghana NPS scoring system with established nutrition science principles to ensure that foods classified as **"healthier"** align with dietary recommendations; and evaluating nutrient distributions among food categories to verify whether expected nutrient-density patterns (e.g., fruits scoring higher than confectionery) hold true. Convergent validity is a specific subtype of construct validity that checks whether the NPM's results correlate well with other measures of the same concept of healthy diet or food quality. Such assessments – comparing the classifications of packaged foods by the Ghana NPS with those from other models such as the WHO, Nutri Score, the Kenya and South Africa models are currently underway.

Comparing the NPS' **"Encourage, Moderate, Limit"** classification to the NOVA classification (1–4) showed a highly non-random distribution of foods across the two systems [^{2}(6, N = 6,404) = 2623.82, **p** < .001)], and Cramér's V of 0.45, indicating a large effect size – suggesting substantial alignment between the two classification systems. Further, convergent validity was assessed by treating the Ghana NPS categories and the NOVA categories as independent nutrient profiling models that rank or classify foods according to related but distinct conceptual criteria. Directional hypotheses were specified a priori: foods classified as **"Limit"** under the Ghana NPS were expected to align predominantly with NOVA 4 (ultra-processed foods), while foods classified as **"Encourage"** were expected to align primarily with NOVA 1–3 (non- or minimally-processed foods).

Consistent with these hypotheses, foods classified as Limit were overwhelmingly ultra-processed, with 2,655 of 3,002 foods (88.4%) classified as NOVA 4. This cell exhibited a very large positive standardized residual (+18.58), indicating that Limit foods were substantially overrepresented in NOVA 4 relative to

chance expectations. Correspondingly, Limit foods were significantly underrepresented in NOVA 1–3 categories, particularly NOVA 3 (standardized residual = -20.91).

Foods classified as Encourage showed similarly strong and theoretically consistent convergence. A total of 1,233 of 1,345 foods (91.7%) classified as Encourage fell within NOVA 1–3, while only 112 foods (8.3%) were classified as NOVA 4. Standardized residuals indicated pronounced overrepresentation of Encourage foods in NOVA 1 (+16.65), NOVA 2 (+9.43), and NOVA 3 (+25.76), alongside strong underrepresentation in NOVA 4 (-24.94). Foods classified as Moderate displayed an intermediate distribution across NOVA categories, with modest overrepresentation in NOVA 3 (standardized residual = +4.43) and slight underrepresentation in NOVA 4 (-2.27), consistent with the conceptual positioning of this category between Encourage and Limit.

To further assess convergent validity, both classification systems were collapsed into binary constructs reflecting theoretically aligned categories. Foods classified as "Encourage" were compared against NOVA 1–3 (non- or minimally-processed foods), while foods classified as **"Limit"** were compared against NOVA 4 (ultra-processed foods). Foods classified as **"Moderate"** were excluded from this analysis to preserve conceptual clarity. Binary agreement analyses demonstrated strong convergence between the two systems. Cohen's kappa indicated substantial chance-corrected agreement (κ = 0.76). Of foods classified as **"Limit,"** 88.4% were classified as ultra-processed (NOVA 4), while 91.7% of foods classified as "Encourage" were classified as NOVA 1–3. The positive predictive value of the "Limit" classification for identifying ultra-processed foods was 96.0%, with a negative predictive value of 78.0%.

Together, these findings provide robust evidence of convergent validity, demonstrating that two independent nutrient profiling models align strongly in their identification of foods to encourage versus limit. Further analysis comparing the performance of the Ghana NPS on 28,609 packaged food and beverage products marketed in Ghana relative to five other NPMs are summarized in Box 4.

Box 4. Comparative Performance of the proposed Ghana Nutrient Profiling System on 28,609 packaged food and beverage products marketed in Ghana and other African countries between 2020 and 2023.

This comparative assessment applied six NPMs to 28,609 packaged food and beverage products marketed in Ghana, Kenya, Nigeria, Tanzania and South Africa between 2020 and 2023. The data was obtained from the Mintel Global New Product Database, and exhibited very high prevalence of missing nutrition information, with 54% of products lacking trans-fat data, 17% lacking saturated-fat data, and 14% lacking sodium data, and added sugars (5%). Of note, the food products do not declare free sugars (100% of the free sugars data used in the analysis was imputed; 85% of the added sugars data was imputed).

Comparative compliance analysis (see figure 2 of Appendix 5) shows that the proposed Ghana NPS converges closely with the WHO Africa Region NPM in overall stringency, particularly for beverages, where both models classify approximately 85–87% of products as non-compliant. For foods, the Ghana NPS is moderately less stringent than WHO AFRO (63% vs 75% non-compliant), with a higher share of exempt or unassessable products (approximately 14%), reflecting sensitivity to incomplete labelling rather than weaker nutrient thresholds. Relative to other models, Ghana NPS is broadly more stringent than PAHO, Kenya, and Nutri-Score, and roughly comparable to SA FOPL for beverages. For beverages, the Ghana NPS classifies 85% of products as non-compliant, compared with 70% under PAHO, 72% under the Kenyan NPM, and 77% under Nutri-Score, while aligning almost exactly with SA FOPL (85%) and closely with WHO AFRO (87%).

For foods, the Ghana NPS classifies 63% of products as non-compliant, compared to PAHO (70% non-compliant but with higher - 25 exemptions), Kenyan (75% with 12 exemptions), and Nutri-Score (48% with 4 exemptions), while remaining less stringent than WHO AFRO (75%). Relative to the PAHO and South African FOPL models, the Ghana NPS consistently identifies a larger proportion of foods and beverages as non-compliant, particularly for sodium, total sugars, and saturated fats, indicating stronger discrimination of nutritionally poor products. The relative risk (RR) of non-compliance under Ghana NPS versus comparators is:

- Foods: RR 0.84 vs WHO AFRO/Kenya, RR 0.90 vs PAHO, RR 1.02 vs SA FOPL, and RR 1.31 vs Nutri-Score
- Beverages: RR 0.98 vs WHO AFRO, RR 1.00 vs SA FOPL, RR 1.18 vs Kenya, RR 1.21 vs PAHO, and RR 1.10 vs Nutri-Score.

This means that a product is more likely to be flagged as non-compliant under the Ghana NPS than under PAHO, Kenya, or Nutri-Score, especially for beverages. The Ghana NPS identifies about 20% more beverages as non-compliant relative to the PAHO Model.

This provides additional empirical evidence to inform the regulatory applications of the Ghana NPS. The significant proportion of products without nutrition information, underscores the necessity of treating products with missing regulated nutrients or ingredients as non-compliant until mandatory labelling improves. Evidence of non-sugar sweeteners in beverages (28%) supports explicit NSS provisions to prevent unintended reformulation pathways..

2.3.3.3. Criterion validity

Criterion validity links the model's scores to objective health metrics, such as nutrient intake or biomarker levels. Future plans include testing the NPM using Ghanaian dietary datasets (e.g., dietary intake, BMI, blood pressure) to confirm that favourable NPM scores or food categories align with healthier dietary patterns. This will help validate that the NPS correlates with actual health outcomes in the Ghanaian population.

2.3.3.4. Predictive validity

Predictive validity assesses whether the NPM can forecast long-term health outcomes. Though longitudinal data are currently limited in Ghana, future studies will examine whether adherence to the NPM predicts lower incidence of obesity, hypertension, and other non-communicable diseases.

03

APPLICATION OF THE GHANA NPS

3. APPLICATION OF THE GHANA NPS

The principal aim of the Ghana NPS is to facilitate the classification, ranking, or categorization of foods as unhealthy, less healthy, or healthy. The tool will then be applied to food-based policies (including front of pack labelling; policies restricting the marketing of designated foods or counter marketing of healthier foods to encourage their consumption; fiscal policies (tax policy to limit consumption of unhealthy foods or subsidies to make healthier food attractive and accessible; public food procurement and service policies to prioritize procurement and provisioning of healthier foods in public settings.

While the primary goal of the policies is to create an enabling environment needed for the reduction of health-harming foods from Ghana's food environments and promotion of healthier dietary choices, the implementation of the policies may also incentivize food manufacturers to improve product formulation. Other uses include nutrition education, development of benchmarking, nutrition guidelines and standards for foods sold in school cafeterias and other public institutions.

3.1. Applications to policies

The NPS will be applied to food-based policies such as front of pack labelling (warning and promotive labelling), food marketing restrictions or promotion (counter marketing), fiscal policies (tax or subsidies) public food procurement and service schemes as outlined below. Before detailing the application of the NPS across these policy domains, the section below first outlines the standardized approach for using the Ghana NPS to profile and classify foods and food products.

3.1.1. How to use the Ghana NPS to profile foods

The Ghana NPS shall be applied as a standardized decision-making framework for the classification, ranking, and categorization of foods and food products for regulatory and policy purposes. The following steps outline its application.

START

Step 0: Identify the product and answer this question.

- Is the item or product a food or pre-packed food product intended for sale, marketing, procurement, or consumption in Ghana? See definitions of food and pre-packaged food under glossary
    - If Yes, Proceed to Step 1
    - If No, The product is outside the scope of Ghana NPS

Step 1: Identify the applicable food category and apply the Ghana NPS category-specific thresholds.

Once the product has been confirmed as a food or food product under Step 0:

- Assign the product to one of the seven food categories listed in Table 1 and Table 3, using the category name, category description, and examples provided.
- Use the product's food identity, principal ingredient, physical form, intended use, and usual mode of consumption to determine the most appropriate category.
- Do not use brand names, marketing claims, fortification claims, or front-of-pack descriptions as the basis for category assignment.
- For products sold as powders, concentrates, dry mixes, or other items requiring preparation, assess the product as sold and, where instructions are provided, as prepared or reconstituted according to the manufacturer's instructions.
- After the category has been identified, apply the nutrient thresholds linked to that category in Table 3 to determine whether the food exceeds any established cut-off point.
- Where a product does not clearly fit any category, use the closest applicable category based on composition and customary use. Document the decision, and refer difficult cases to the designated Ghana NPS technical authority for clarification or confirmation.

Step 2: Classification Based on Thresholds or Cut-off Points

Category 1 foods or food products are those that exceed one or more Ghana NPS thresholds for nutrients or food components of public health concern.

Such Category 1 foods shall:

- be required to carry one or more mandatory front-of-pack warning labels, in accordance with the Ghana National FOPL Policy.
- be ineligible to carry positive logos.
- be ineligible to carry nutrition and health claims
- be subject to food marketing restrictions measures
- be ineligible for subsidies, and may be subject to taxation as per the food-related fiscal policy dictates
- not be prioritized for public food procurement or service schemes.

END OF PATHWAY

Category 2: Foods with No Front-of-Pack Warning Labels

Foods or food products that do not exceed any Ghana NPS thresholds for nutrients or food components of public health concern shall be classified as Category 2 foods.

Category 2 foods shall:

- not be required to carry front-of-pack warning labels.
- be further assessed using the Ghana NPS holistic scoring system to determine their relative level of healthfulness.

Such foods may be eligible for promotion or counter-marketing, subject to applicable policies.

Next Step

Proceed to holistic nutrient profiling using the Ghana NPS scoring framework (Appendix 3B) to determine relative healthfulness.

Answer this question.

Does the product meet at least one of the following?

a) Belongs to the Ghana NPS Food Group 7 (including fresh fruits, vegetables, pulses, and whole grains that are not ultra-processed and is not a category 1 food);
b) Is a nutrient-rich food with favorable Ghana NPS scores of 7 or higher (and is not a category 1 food);

If Yes, to a) or b) , classify food as Category 3 food.

If No, food remains a Category 2

Category 3 foods:

- May be eligible to carry a positive logo, in accordance with the Ghana National FOPL Policy.
- May be prioritized for targeted subsidy programs under food-related fiscal policy.
- Shall be prioritized for public food procurement and service schemes.
- Shall be eligible for promotion through appropriate marketing and counter-marketing strategies.

Of note, foods that do not meet Category 3 priority criteria and remain as Category 2 foods shall.

- Not carry warning labels
- Be ineligible for counter-marketing resources or initiatives
- Not be prioritized for subsidies or public food procurement
- Healthfulness communicated via NP score-derived positive logos

These steps are summarized in the decision tree below (see Fig3)

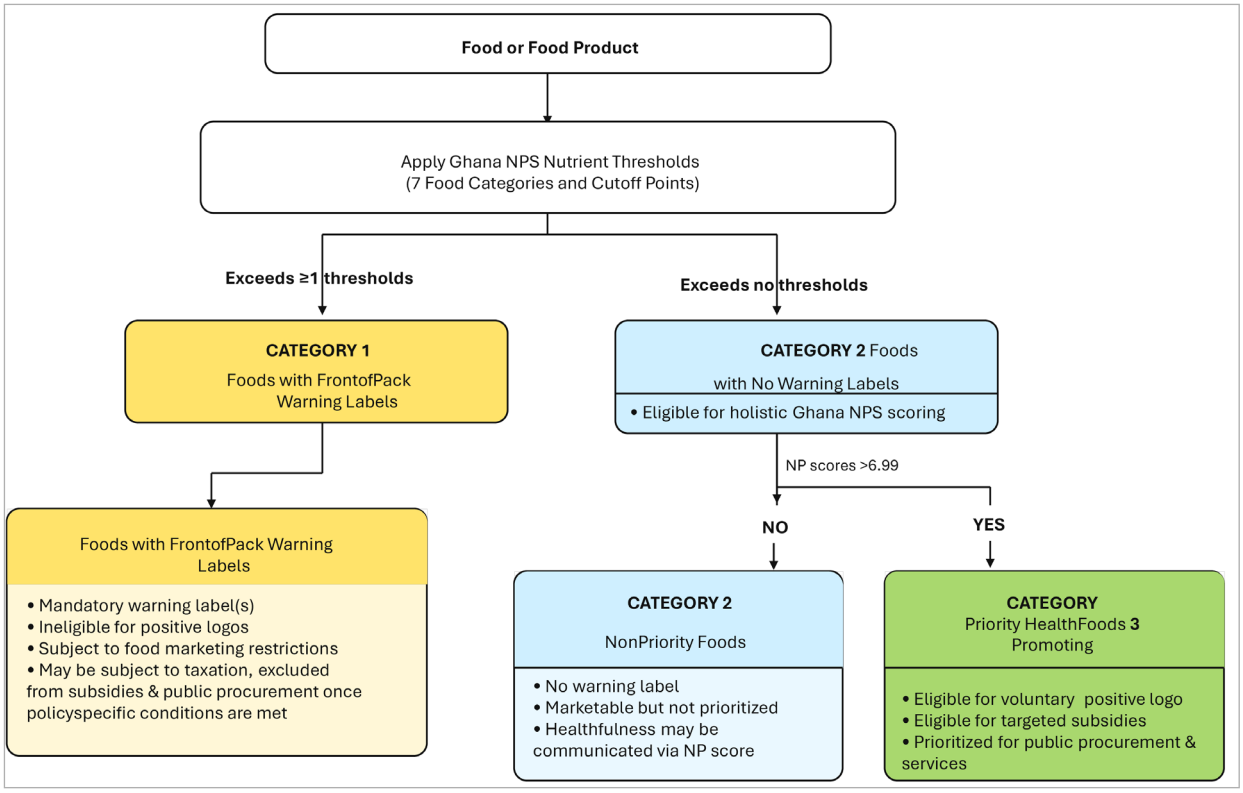


Figure 3. Decision Tree for Profiling Foods under the Ghana Nutrient Profiling System (NPS).

Legend: The figure illustrates the stepwise application of the Ghana NPS to classify foods and food products into Category 1 (foods exceeding nutrient thresholds and requiring front-of-pack warning labels), Category 2 (foods not exceeding thresholds), and Category 3 (a priority subset of Category 2 foods eligible for positive logos, subsidies, and public food procurement).

3.1.2. Application of the Ghana NPS to FOPL Policy in Ghana

The Ghana National FOPL policy establishes clear guidelines that ensure that food systems actors (including consumers) are provided with accurate, easily accessible, and actionable information about the nutritional quality of food products. The FOPL system consists of two components: warning labels for foods with excessive levels of nutrients or food components of public health concern (nutrients or food components to discourage), and positive logos for foods that meet health-promoting standards.

Warning labels

Warning labels are mandatory for foods that exceed the Ghana NPS thresholds for nutrients of public health concern. These labels are required in the following instances:

- **High or excessive sugar content:** Foods with sugar (total sugars) levels above the threshold set for public health safety by the Ghana NPS.
- **High or excessive sodium levels:** Foods with sodium content exceeding the allowable limit as set by the Ghana NPS.

» **Excessive amount of unhealthy fats:** Foods with levels of saturated fats exceeding limit set by the Ghana NPS.

» **Excessive amount of industrially produced trans-fatty acids:** Foods containing more than 1% of total energy from industrially produced trans-fatty acids or exceeding 2% of total fat content or exceeding 2g of iTFAs per 100g of total fat. Of note, food ingredients list include partially hydrogenated oils (PHOs) are not permitted.

» **Ultra-processed foods or artificial sweeteners:** Foods designated as ultra-processed or food containing any amount/quantity of artificial sweeteners including non-sugar sweeteners (NSS), or non-caloric sweeteners (NCS), or non-nutritive sweeteners (NNS).

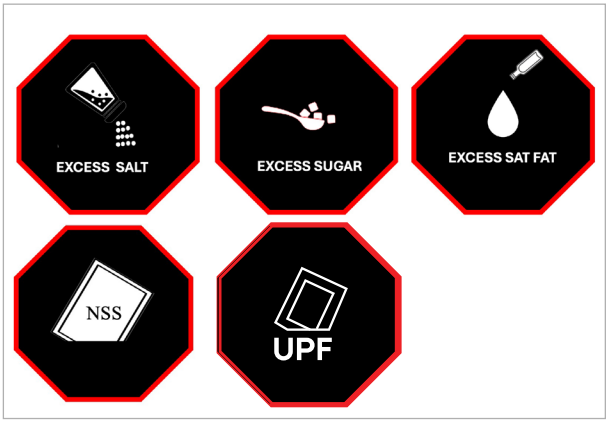


Figure 4a. Proposed FOPL Warning Labels, Ghana

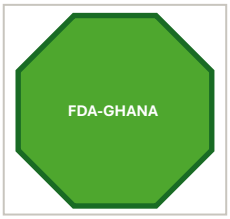


Figure 4b. Proposed FOPL Positive Label, Ghana

Positive logos

Positive logos or labels will be used to encourage healthier food choices by identifying products that align with the set standards. Foods may qualify for a positive logo if they meet the set criteria. For processed pre-packed foods, meeting condition #1 is a prerequisite:

1. **Front-of-pack warning labels:** Foods bearing or designated to bear warnings indicating high levels of unhealthy ingredients (e.g., sugar, sodium, or unhealthy fats) are ineligible for positive logos
2. **Healthier food options (Food Group 7 of the Ghana NPS):** Fresh fruits, vegetables, pulses, and whole grains that are not ultra-processed.
3. **Nutrient-rich products:** Nutrient-dense foods with applicable NP scores that are not designated to carry a FOP warning label.

Label Design, Size, and Placement Specifications

(a) Warning labels and positive logos shall comply with applicable regulations by the Government of Ghana and design specifications issued by the Food and Drugs Authority.

(b) Such specifications shall include:

» minimum size of not less than five percent (5%) of the principal display panel.

» placement on the upper front portion of the principal display panel.

» a clear space/buffer of at least three millimetres (3 mm) surrounding the label or logo, free from text or graphics.

» high-contrast colour and shape requirements to ensure legibility; and

» prohibition of distortion, rotation, partial display, or obscuring.

1. Multiple Warning Labels

Where a food product exceeds thresholds for more than one nutrient, all applicable warning labels shall be displayed concurrently in accordance with layout rules prescribed by the Authority.

2. Enforcement

Failure to comply with front-of-pack labelling requirements constitutes a regulatory offence and may attract administrative penalties, product withdrawal, or other sanctions as prescribed by law.

3.1.3. Application of the Ghana NPS to the implementation of the Ghana Food Marketing Restrictions Policy.

The Ghana Food Marketing Restrictions Policy establishes guidelines to ensure that all foods marketed in Ghana are not harmful to human health, and rather contribute, positively, to the health, safety, and wellbeing of people living in Ghana. The Policy adopts the WHO definition of marketing - **"any form of commercial communication or message that is designed to, or has the effect of, increasing the recognition, appeal and/or consumption of particular products and services. It comprises anything that acts to advertise or otherwise promote a product or service"[75].** Counter-marketing, on the other hand, refers to strategies that aim to reduce the demand for unhealthy products by exposing the motives and undermining the marketing practices of producers. In the context of food, counter-marketing seeks to decrease the consumption of unhealthy food and beverages by challenging and countering the marketing efforts that promote these products[76, 77].

Key criteria for marketing restrictions

Marketing of food products is restricted if they meet any of the following criteria:

1. Foods bearing or designated to bear warnings indicating high levels of nutrients or food components of public health concern (including sugar, sodium, or unhealthy fats – saturated fats, TFAs).
2. Food or food products containing any amount of artificial sweeteners or are ultra-processed

Criteria for counter-marketing or promotion of foods

To encourage healthier eating habits, the following criteria are prioritized for the promotion and counter-marketing of foods:

1. Healthier, unprocessed or minimally processed options such as fresh fruits, vegetables, pulses, as well as minimally processed whole grains
2. Nutrient-rich foods that carry a positive FOPL.
3. Foods eligible for targeted subsidies under the national food-related fiscal policy or prioritized for procurement as part of the public food procurement and service policy.

Scope of Marketing Restrictions and Enforcement

Marketing restrictions shall apply to all forms of commercial communication, including advertising, promotion, sponsorship, endorsements, brand stretching, and digital or social media marketing. The Food and Drugs Authority and other designated competent authorities shall enforce compliance with food marketing restrictions. The Government of Ghana/FDA will issue applicable instrument or regulations specifying the restrictions to be implemented, as well as mechanisms (and cooperation with other agencies to implement, monitor and enforce marketing restrictions across different settings and channels). A person who contravenes marketing restrictions commits an offence and is liable to administrative or other sanctions as prescribed by law.

3.1.4. Application of the Ghana NPS to the implementation of Food-related fiscal policy.

The implementation of the Ghana food-related fiscal policy for the promotion of healthy diet will be facilitated by the Ghana NPS as follows. Foods or food products subject to taxation will include those that are designated by the NPS to bear front-of-pack warning label (and or are prohibited from being marketed), or food currently covered by the Ghana Excise Duty Amendment Act (Act 1108). Foods qualifying for subsidies will be determined by the Ghana NPS. The policy will cover targeted subsidies for qualifying healthier food options, such as fruits, vegetables, pulses, minimally processed whole grains that are not restricted from marketing or are not designated by the Ghana NPS to bear a front of pack warning label or prioritized for procurement under the government public food procurement programmes, hospitals, early childhood development centers, and high schools social protections interventions (school feeding programme). This is to make the healthier food options more affordable and accessible to the most vulnerable population.

3.1.5. Application of the Ghana NPS to the implementation of the Ghana Public Food Procurement and Service Policy

The Ghana Public Food Procurement and Service Policy is designed to ensure that all foods procured, served, or sold within public settings in Ghana contribute to the health, safety, and wellbeing of Ghanaians. By employing nutrient-based, food-based, food safety and sustainability criteria, the policy prioritizes foods that align with the Ghana NPS.

Foods bearing front-of-pack warning labels, those restricted from marketing, or those subject to health-related taxes (as stipulated by the Ghana NPS) will not be prioritized for procurement or provisioning. These exclusions reinforce a commitment to healthier public food environments.

Foods to be prioritized for procurement - under the government public food procurement schemes for hospitals, early childhood development centers, high schools, social protections interventions (including the Ghana school meal programme) will include fruits, vegetables, pulses, minimally processed whole grains that are not restricted from marketing or are not designated by the Ghana NPS to bear a front of pack warning label.

04

IMPLEMENTATION ARRANGEMENTS, MONITORING AND EVALUATION OF THE GHANA NUTRIENT PROFILING SYSTEM (NPS)

4. IMPLEMENTATION ARRANGEMENTS, MONITORING AND EVALUATION OF THE GHANA NUTRIENT PROFILING SYSTEM

4.1. Periodic reviews and updates to the model based on emerging evidence

The effective implementation of the Ghana NPS requires clear institutional arrangements, intersectoral coordination, and a robust monitoring and evaluation (M&E) framework. Given that the Ghana NPS underpins multiple policy instruments spanning the health, agriculture, trade, and finance sectors, its implementation shall be guided by a whole-of-government approach. This section outlines the institutional arrangements, coordination mechanisms, and monitoring and evaluation processes that will support the effective implementation, continuous improvement, and accountability of the Ghana NPS.

While detailed monitoring and enforcement provisions for specific policy applications (front-of-pack labelling, food marketing restrictions, fiscal policies, and public food procurement) are articulated in their respective policy and regulatory instruments, this section defines the cross-cutting implementation and oversight framework for the NPS itself.

4.2. Institutional and Intersectoral Implementation Arrangements

4.2.1. Lead and Coordinating Institutions

The Ministry of Health (MoH), through the Food and Drugs Authority (FDA), shall serve as the lead technical authority responsible for the overall coordination, technical oversight, and scientific integrity of the Ghana NPS.

However, given the multi-sectoral application of the NPS, implementation shall be coordinated through an Inter-Ministerial NPS Implementation and Oversight Mechanism, involving, at a minimum:

- **Ministry of Health (MoH)** – providing public health leadership, regulatory oversight, and alignment with existing nutrition and NCD policies;
- **Food and Drugs Authority (FDA)** – responsible for technical administration of the NPS, food composition

assessment, labelling compliance, and enforcement coordination;

- **Ministry of Food and Agriculture (MoFA)** – ensuring application and alignment with the pubic food procurement and service policy;
- **Ministry of Trade and Industry (MoTI)** – alignment with trade, manufacturing, and marketing regulations, including compliance by food manufacturers and importers.
- **Ministry of Finance (MoF)** – application of the NPS to food-related fiscal policies, including taxation and subsidy instruments; and
- other relevant Ministries, Departments, and Agencies (MDAs), including those authorities with a role in regulating marketing across different channels or settings or in the design, implementation, enforcement or monitoring of the policies to which this NPS applies.

This intersectoral mechanism shall facilitate policy coherence, coordinated implementation, and consistent application of the Ghana NPS across sectors.

4.2.2. Roles of Non-State Actors

Implementation of the Ghana NPS shall also involve structured engagement with:

- relevant private sector eg food manufacturers and importers, to ensure accurate product data and compliance.
- consumer protection and civil society organisations, to support transparency and accountability; and
- academic and research institutions, to support evidence generation, validation studies, and independent evaluation.

4.3. Mechanisms for Tracking Implementation Effectiveness

A comprehensive monitoring and evaluation framework, complemented by post-launch validation studies, shall be employed to assess the effectiveness of the Ghana NPS and its policy applications.

4.3.1. Continuous Data Collection and Reporting

The FDA, in collaboration with academia (the School of Public Health of the University of Ghana), the FLIP-Ghana team, shall oversee a standardized protocol for the continuous collection, management, and reporting of data on the nutrient composition and labelling characteristics of packaged food products in Ghana.

This will involve:

- leveraging existing FDA food databases;
- integrating the Food Label Information Program (FLIP) platform as a core digital monitoring tool.

FLIP-Ghana will enable near real-time monitoring, longitudinal tracking of products,

and systematic analysis of changes in the food supply, thereby strengthening regulatory responsiveness and decision-making.

4.3.2. Key Performance Indicators (KPIs)

Specific, measurable, achievable, relevant, and time-bound (SMART) indicators shall be established to assess implementation progress and outcomes. These may include, but are not limited to:

- changes in the availability and market share of foods exceeding thresholds for saturated fats, trans-fatty acids, free sugars, and sodium;
- proportion of packaged foods compliant with marketing and FOPL requirements;
- increased market availability of healthier alternatives (category 2 or 3 foods).
- uptake of healthier foods within public procurement and subsidy programmes.

4.4. Stakeholder Engagement and Feedback Mechanisms

The formal stakeholder engagement platforms established during the development of the Ghana NPS (eg the NPS sub-committee of the M3T) shall be institutionalised to support ongoing implementation. These mechanisms shall facilitate regular feedback from:

- public health authorities;
- regulatory agencies;
- consumer and civil society groups; and
- private sector actors.

Such feedback shall be used to identify implementation challenges, unintended consequences, and opportunities for improvement, while safeguarding against conflicts of interest.

4.5. Periodic Review and Updating of the Ghana NPS

To ensure that the Ghana NPS remains scientifically robust, contextually relevant, and responsive to market dynamics, the system shall undergo periodic reviews.

These reviews shall:

- incorporate emerging scientific evidence on nutrition, diet-related diseases, and public health outcomes;
- monitor changes in the packaged food and beverage supply, including new product introductions and reformulation trends; and

» ensure continued coherence with national dietary guidelines and international best-practice recommendations.

Role of FLIP-Ghana in Periodic Review

The integration of FLIP-Ghana, adapted from the University of Toronto's Food Label Information Program, shall serve as the primary data platform supporting periodic review and updating of the NPS.

FLIP-Ghana systematically compiles detailed information from packaged food labels, including nutrient composition, ingredient lists, product identifiers, and nutrition and marketing claims. By enabling longitudinal tracking of products through barcodes and other identifiers, the system will support:

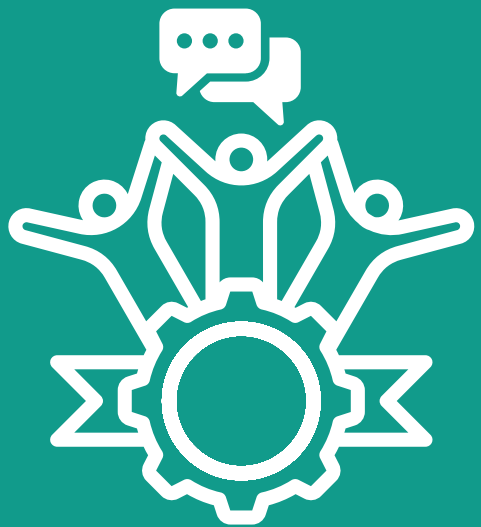
» evidence-based review of nutrient thresholds;

» monitoring of reformulation and marketing practices; and

» transparent, comparable analyses across time.

05

CAPACITY BUILDING AND COMMUNICATION



5. CAPACITY BUILDING AND COMMUNICATION

Effective implementation of the Nutrient Profiling System (NPS) depends on targeted capacity building, clear communication, and improved public understanding of the system. A multi-pronged approach has been adopted to strengthen institutional and technical capacity among key stakeholders and to support public awareness of healthier food choices.

Implementation of the NPS will be accompanied by ongoing monitoring, including attention to corporate political activity (CPA), to safeguard the integrity of the system and ensure transparent and accountable implementation.

5.1. Training of Stakeholders

Capacity-building efforts will focus on the following groups:

- **Data Teams** will be trained in food composition data compilation, management, and analysis to support accurate application of the NPS.
- **Regulatory Personnel** will receive targeted training to strengthen competencies in monitoring, enforcement, and compliance assessment related to the NPS.
- **Food Industry** will receive technical guidance and training for food manufacturers on product reformulation, nutrient optimization, and compliance with NPS criteria.
- **Health Professionals** will receive continuing professional development to support the effective use of the NPS in dietary counselling and public health practice.

5.2. Sensitization and public awareness campaigns

Public communication efforts will aim to improve understanding of the NPS and promote healthier food choices through strategic communication, community engagement, and partnerships:

Strategic communication interventions will leverage evidence-informed messaging to explain the purpose and benefits of the NPS, to educate the public on the FOPL system and the rationale, benefits and mechanisms of the policies that the NPS is intended to implement. Community engagement will include outreach activities using community networks and trusted local actors to support awareness and uptake, and partnerships will entail collaboration with civil society, educational institutions, and relevant private-sector actors to broaden reach and reinforce consistent messaging.

06

STRENGTHS AND LIMITATIONS OF NUTRIENT PROFILING

6. STRENGTHS AND LIMITATIONS OF NUTRIENT PROFILING

The Ghana NPS aims to address key public health challenges by categorizing foods based on nutrient composition and linking them to policy actions such as front-of-pack labeling, marketing restrictions, fiscal policies, and public procurement. While its design is comprehensive and rigorous, the NPS, like others, does have limitations that merit consideration.

General limitations of nutrient profiling models. Nutrition profiling is a versatile tool, but by no means a cure-all. When nutrient profiling systems focus exclusively on nutrients to limit, they become limiting especially in contexts where multiple forms of malnutrition are rife. Secondly, these systems rarely include non-nutrient substances such as phytochemicals, or food components or contaminants and food additives which may affect the health of some, particularly vulnerable, people.

Incomplete consideration of food safety and sustainability. Current models do not incorporate sustainable healthy diets considerations which are related to non-nutritional factors including socio-cultural, ethical, and environmental concerns. For instance, sustainable, plant-based foods with minimal ecological footprints may be excluded due to nutrient thresholds. Ethically, such exclusions can marginalize traditional and culturally significant foods. Incorporating multidimensional criteria could align nutrient profiling systems with sustainable dietary guidelines[4]. While addressing nutrient composition, the Ghana NPS does not encompass food safety concerns such as contaminants or food additives, which may have disproportionate effects on vulnerable populations.

Reductionism. Nutrient profiling models simplify food classification by focusing primarily on nutrient content, often disregarding the synergistic health effects of whole foods. This reductionist approach risks penalizing nutrient-dense traditional dishes, such as fermented foods or broths rich in beneficial compounds, due to elevated sodium or fat levels. One of the main criticisms concerning nutrient profiling schemes is that there are healthy and less healthy foods, but there are also healthy and less healthy diets.

Challenges in capturing the food matrix effect. The food matrix refers to the physical and chemical structure of a food, which influences nutrient absorption and metabolic responses. For instance, sugars in whole fruits are metabolized differently than those in processed beverages due to the fiber content. Failure to account for these interactions can misclassify foods, potentially leading to poor dietary guidance. Studies have shown that the food matrix plays a critical role in moderating the effects of nutrients on health outcomes[78].

Thresholding in nutrient profiling create arbitrary distinctions, such as labeling foods as **"healthy"** or **"unhealthy"** based on

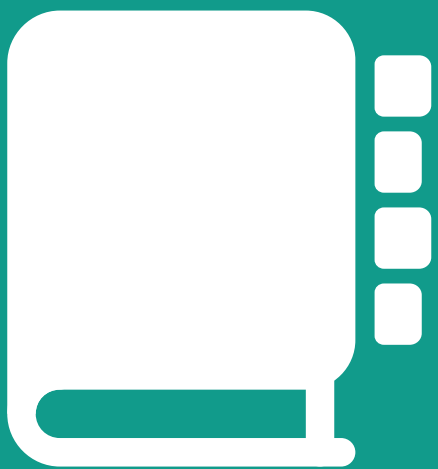
nutrient cut-offs. This simplification does not reflect the complexity of dietary quality or the continuum of health risks. The imposition of clear nutrient thresholds simplifies complex dietary dynamics, potentially categorizing borderline foods inappropriately as either **"healthy"** or **"unhealthy."** For example, foods with borderline sodium levels may be unjustly classified as unhealthy, disregarding other beneficial nutrients. Research emphasizes the need for more nuanced, gradient-based scoring systems to reflect dietary complexity accurately[79]. Some of these limitations are in addressed in the Ghana NPS.

Strengths of the Ghana Nutrient Profiling System

1. Context-specific and evidence-driven --the Ghana NPS is tailored to the unique dietary and public health challenges in Ghana, ensuring it addresses local malnutrition and dietary patterns, while aligning with international guidelines including by the WHO.
2. A hybrid double-duty design – integrating both a continuous and a threshold framework, the NPS is set to address both obesity and undernutrition, and micronutrient deficiencies, the Ghana NPS is a "double-duty" tool guiding interventions for malnutrition in all its forms. It encourages the consumption of beneficial nutrients while limiting harmful ones.
3. Comprehensive scope - the NPS supports a wide range of policy applications, including front-of-pack labeling, food marketing restrictions, fiscal measures, and public procurement policies, ensuring a multi-pronged approach to improving public health.
4. Transparent and inclusive development - The system was developed through a government-led, multi-stakeholder process that emphasized transparency and inclusivity.
5. Sustainability consideration - by including low-carbon and sustainable food options as criteria for positive logos, counter marketing and subsidies, the Ghana NPS integrates health and environmental sustainability objectives.
6. Robust validation - The Ghana NPS underwent multiple validation processes, including construct, content, face, and convergent validity checks, ensuring its scientific rigor and applicability. Future criterion and predictive validity tests will further strengthen its credibility

07

GLOSSARY



7. GLOSSARY

Added Sugars: Sugars added to foods and beverages by the manufacturer, cook or consumer during processing or preparation.

Advertising: The paid public presentation and promotion of ideas, goods, or services by a sponsor intended to bring a product to the attention of consumers through various media channels such as broadcast and cable television, radio, print, billboards, the Internet, or personal contact.

Children: In the context of this NPS, the term "children" refers to persons aged 2 to 19 years – in line with WHO definition.

Culinary Ingredients: Substances extracted directly from unprocessed or minimally processed foods or from nature and commonly consumed (or consumable) as ingredients of culinary preparations. The extraction process can include pressing, grinding, crushing, pulverizing, and drying. These substances are used to season and cook unprocessed or minimally processed foods and create freshly prepared dishes. Additives help preserve foods' properties or avoid the proliferation of microorganisms.

Energy: The total chemical energy available in food (in kilocalories or kcal) and its macronutrient constituents (carbohydrates, fats, and proteins).

Free Sugars: Monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook, and/or consumer, plus sugars that are naturally present in honey, syrups, and juices.

Food additive: A substance notnormally consumed as a food by itselfand not typically used as a standard infood, regardless of it nutritive value. It is intentionally added for a technological (including organoleptic) purpose during manufacture, processing, preparation, treatment, packing, packaging, transport, or storage. This addition results in, or may be reasonably expected to result in, the additive or its byproducts becoming a component of the food. The term excludes contaminants, substances added solely to maintain or improve nutritional qualities, sodium chloride or processing aids.

Marketing: Various practices that constitute a commercial communication or message designed to, or having the effect of, increasing the recognition, appeal, and/or consumption of particular products and services. It comprises anything that acts to advertise or otherwise promote a product or service, including sponsorship, CSR activities or any other communication or activity that has the effect or intended effect of increasing awareness of, or loyalty to, a product, service, brand or business market research.

Minimally Processed Foods: Unprocessed foods that have undergone cleaning, removal of inedible or unwanted parts, drying, grinding, fractionation, roasting, boiling, pasteurization, cooling, freezing, vacuum packing, and/or non-alcoholic fermentation. Also include combinations of two or more

unprocessed or minimally processed foods; minimally processed foods with added vitamins and minerals to restore the original micronutrient content or for public health purposes; and minimally processed foods with additives designed to preserve their original properties, such as antioxidants and stabilizers.

Non-Sugar Sweeteners: Food additives (other than a mono- or disaccharide sugar), that impart a sweet taste to a food, including artificial non-caloric sweeteners (e.g., aspartame, sucralose, saccharin, and acesulfame potassium); natural non-caloric sweeteners (e.g., stevia); and caloric sweeteners such as polyols (e.g., sorbitol, mannitol, lactitol, and isomalt). Functional class includes sweetener, intense sweetener, bulk sweetener. It should be noted that products like sugars, honey and other food ingredients that can be used to sweeten are not associated with the term "sweetener".

Nutrient profiling: The science of categorizing foods according to their nutritional composition for reasons related to preventing disease and promoting health

Nutrient Profiling Model (NPM): A science-based tool that evaluates the nutritional quality of foods and beverages—categorizing, classifying, or ranking them according to their nutritional composition and their impact on health

Nutrient Profiling System (NPS): a broader framework or platform that includes one or more nutrient profiling models, scoring systems, thresholds, validation approaches, and their application in policy interventions including implementation strategies, communication tools, and guidelines for use.

Processed Food Products: Food products manufactured by industry in which salt, sugar, or other culinary ingredients have been added to unprocessed or minimally processed foods to preserve them or make them more palatable.

Pre-packaged food: Any food contained in a packaging, regardless of its origin, which is packaged in the absence of the customer and ready to be sold or offered to the consumer.

Saturated Fat: Fat molecules with no double bonds between carbon molecules. The major saturated fatty acids in the diet are C14, C16, and C18, except in the case of milk and coconut oil, where saturated fatty acids range from C4 to C18 except in

Sodium: A soft, silver-white element found in salt; 1 gram of sodium equals about 2.5 grams of salt.

Total fat: The total fat content of a food product composed of fatty acids from the three main groups (saturated fatty acids, mono un- saturated fatty acids, and polyunsaturated fatty acids), which are differentiated based on chemical composition.

Total sugars: All sugars from all sources in a food, defined as "all monosaccharides and disaccharides other than polyols." This concept is used for labeling purposes.

Trans fat: A form of fat that results from the hydrogenation of unsaturated fatty acids or occurs naturally in the milk and meat of certain animals. The most common trans-fatty acids in current food products are isomers (18:1 trans) derived from partial hydrogenation of vegetable oils.

Trans-fat (Industrially produced): A form of fat produced by partial

hydrogenation of unsaturated fatty acids (vegetable oils) to create semi-solid fats for use incommercial baking and frying, margarines and food manufacturing.

Ultra-processed food products: Industrial formulations manufactured with several ingredients. Like processed products, ultra-processed products include substances from the culinary ingredients category, such as fats, oils, salt, and sugar.

Unprocessed foods: Foods obtained directly from plants or animals that do not undergo any alteration between their removal from nature and their culinary preparation or consumption.

08

REFERENCES

8. REFERENCES

1. Food and Agriculture Organization of the United Nations. (1996). Rome Declaration on World Food Security and World Food Summit Plan of Action : World Food Summit, 13-17 November 1996, Rome, Italy. https://www.fao.org/4/w3613e/w3613e00.htm?utm

2. Swinburn, B., Sacks, G., Vandevijvere, S., Kumanyika, S., Lobstein, T., Neal, B., Barquera, S., Friel, S., Hawkes, C., Kelly, B., L'Abbé, M., Lee, A., Ma, J., Macmullan, J., Mohan, S., Monteiro, C., Rayner, M., Sanders, D., Snowdon, W., Walker, C., and INFORMAS. (2013). INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): Overview and key principles. Obesity Reviews, 14(S1), 1-12.

3. World Health Organization. (2020). Healthy diet (Fact sheet). https://www.who.int/news-room/fact-sheets/detail/healthy-diet.

4. World Health Organization and Food and Agriculture Organization of the United Nations. (2019). Sustainable healthy diets: Guiding principles. Rome. https://www.who.int/publications/i/item/9789241516648.

5. World Health Organization. (2018). REPLACE: An action package to eliminate industrially-produced trans-fatty acids from the global food supply. WHO. https://www.who.int/teams/nutrition-and-food-safety/replace-trans-fat?utm

6. World Health Organization. (2010). Nutrient profiling: report of a WHO/IASO technical meeting, London, United Kingdom 4-6 October 2010. World Health Organization. https://iris.who.int/handle/10665/336447.

7. World Health Organization. (2019). WHO Guiding Principles and Framework Manual for Front of-Pack Labelling for Promoting Healthy Diets. WHO: Geneva, Switzerland. https://www.who.int/publications/m/item/guidingprinciples-labelling-promoting-healthydiet

8. Rayner, M., Scarborough, P., and Stockley, L. (2004). Nutrient profiles: Options for definitions for use in relation to food promotion and children's diets. Final report. British Heart Foundation Health Promotion Research Group, Department of Public Health, University of Oxford. https://www.researchgate.net/publication/267198176_Nutrient_profiles_Options_for_definitions_for_use_in_relation_to_food_promotion_and_children%27s_diets_Final_report?utm_source=copilot.com#full-text.

9. Drewnowski, A. (2005). Concept of a nutritious food: toward a nutrient density score. The American Journal of Clinical Nutrition, 82(4), 721-732.

10. Drewnowski, A. (2017). Uses of nutrient profiling to address public health needs: from regulation to reformulation. Proceedings of the Nutrition Society, 76(3), 220-229.

11. Azaïs-Braesco, V., Goffi, C., and Labouze, E. (2006). Nutrient profiling: comparison and critical analysis of existing systems. Public Health Nutrition, 9(5), 613-622.

12. Scarborough, P., Rayner, M., and Stockley, L. (2007). Developing nutrient profile models: a systematic approach. Public Health Nutrition, 10(4), 330-336.

13. Labonté, M.-È., Poon, T., Gladanac, B., Ahmed, M., Franco-Arellano, B., Rayner, M., and L'Abbé, M.R. (2018). Nutrient Profile Models with Applications in Government-Led Nutrition Policies Aimed at Health Promotion and Noncommunicable Disease Prevention: A Systematic Review. Advances in Nutrition, 9(6), 741-788.

14. Pan American Health Organization. (2016). Pan American Health Organization Nutrient Profile Model. Washington, DC: PAHO. https://iris.paho.org/handle/10665.2/18621.

15. World Health Organization Regional Office for Africa. (2019). Nutrient Profile Model for the WHO African Region: a tool for implementing WHO recommendations on the marketing of foods and non-alcoholic beverages to children. Brazzaville: WHO Regional Office for Africa. https://www.who.int/publications/i/item/9789290234401.

16. Raine, K.D., Atkey, K., Olstad, D.L., Ferdinands, A.R., Beaulieu, D., Buhler, S., Campbell, N., Cook, B., L'Abbé, M., Lederer, A., Mowat, D., Maharaj, J., Nykiforuk, C., Shelley, J., and Street, J. (2018). Healthy food procurement and nutrition standards in public facilities: evidence synthesis and consensus policy recommendations. Health Promot Chronic Dis Prev Can, 38(1), 6-17.

17. Sarda, B., Kesse-Guyot, E., Srour, B., Deschasaux-Tanguy, M., Fialon, M., Fezeu, L.K., Galan, P., Hercberg, S., Touvier, M., and Julia, C. (2024). How far can reformulation participate in improving the nutritional quality of diets at population level? A modelling study using real food market data in France. BMJ Global Health, 9(3), e014162.

18. Ghana Statistical Service (GSS) and ICF. (2024). Ghana Statistical Service (GSS) and ICF. 2024. Ghana Demographic and Health Survey 2022. Accra, Ghana, and Rockville, Maryland, USA: GSS and ICF.

19. Aryeetey, R., Lartey, A., Marquis, G.S., Nti, H., Colecraft, E., and Brown, P. (2017). Prevalence and predictors of overweight and obesity among school-aged children in urban Ghana. BMC Obes, 4, 38.

20. Adom, T., De Villiers, A., Puoane, T., and Kengne, A.P. (2019). Prevalence and correlates of overweight and obesity among school children in an urban district in Ghana. BMC Obes, 6, 14.

21. Ofori-Asenso, R., Agyeman, A.A., Laar, A., and Boateng, D. (2016). Overweight and obesity epidemic in Ghana-a systematic review and meta-analysis. BMC Public Health, 16(1), 1239.

22. Global Diet Quality Project. (2024). Diet Quality Profile - Ghana. https://www.dietquality.org.

23. Kipo, A.R. (2024). Diet-related non-communicable diseases and population dietary intake in Ghana: A review [Unpublished master's dissertation]. University of Ghana, Legon.

24. Global Data PLC. (2022). Market volume of soft drinks in Ghana, 2011–2020 https://www.globaldata.com

25. Adjei, A.P., Amevinya, G.S., Quarpong, W., Tandoh, A., Aryeetey, R., Holdsworth, M., Agyemang, C., Zotor, F., Laar, M.E., Mensah, K., Addo, P., Laryea, D., Asiki, G., Sellen, D., Vandevijvere, S., and Laar, A. (2022). Availability of healthy and unhealthy foods in modern retail outlets located in selected districts of Greater Accra Region, Ghana. Frontiers in Public Health, Volume 10 - 2022.

26. Amevinya, G.S., Vandevijvere, S., Kelly, B., Afagbedzi, S.K., Aryeetey, R., Adjei, A.P., Quarpong, W., Tandoh, A., Nanema, S., Agyemang, C., Zotor, F., Laar, M.E., Mensah, K., Laryea, D., Asiki, G., Holdsworth, M., and Laar, A. (2022). Advertising of unhealthy foods and beverages around primary and junior high schools in Ghana's most urbanized and populous region. Frontiers in Public Health, Volume 10 - 2022.

27. Yeboah-Nkrumah, A., Vandevijvere, S., Mensah, K., Orlan, E., Nanema, S., Kwame, S., Adjei, A.P., and Laar, A. (2025). Public support and perspectives on the taxation of sugar-sweetened beverages: Results from a pre-implementation nationally representative survey (Unpublished report).

28. Popkin, B.M. and Laar, A. (2025). Nutrition transition's latest stage: Are ultra-processed food increases in low- and middle-income countries dooming our preschoolers' diets and future health? Pediatr Obes, 20(5), e70002.

29. Holdsworth, M., Pradeilles, R., Tandoh, A., Green, M., Wanjohi, M., Zotor, F., Asiki, G.,

Klomegah, S., Abdul-Haq, Z., Osei-Kwasi, H., Akparibo, R., Bricas, N., Auma, C., Griffiths, P., and Laar, A. (2020). Unhealthy eating practices of city-dwelling Africans in deprived neighbourhoods: Evidence for policy action from Ghana and Kenya. Glob Food Sec, 26, 100452.

30. Ministry of Food and Agriculture and University of Ghana School of Public Health. (2023). Food-Based Dietary Guidelines. Accra, Ghana.

31. Laar, A., Barnes, A., Aryeetey, R., Tandoh, A., Bash, K., Mensah, K., Zotor, F., Vandevijvere, S., and Holdsworth, M. (2020). Implementation of healthy food environment policies to prevent nutrition-related non-communicable diseases in Ghana: National experts' assessment of government action. Food Policy, 93, 101907.

32. Laar, A.K., Addo, P., Aryeetey, R., Agyemang, C., Zotor, F., Asiki, G., Rampalli, K.K., Amevinya, G.S., Tandoh, A., Nanema, S., Adjei, A.P., Laar, M.E., Mensah, K., Laryea, D., Sellen, D., Vandevijvere, S., Turner, C., Osei-Kwasi, H., Spires, M., Blake, C., Rowland, D., Kadiyala, S., Madzorera, I., Diouf, A., Covic, N., Dzudzor, I.M., Annan, R., Milani, P., Nortey, J., Bricas, N., Mphumuzi, S., Anchang, K.Y., Jafri, A., Dhall, M., Lee, A., Mackay, S., Oti, S.O., Hofman, K., Frongillo, E.A., and Holdsworth, M. (2022). Perspective: Food Environment Research Priorities for Africa-Lessons from the Africa Food Environment Research Network. Adv Nutr, 13(3), 739-747.

33. Laar, A., Amoah, J.M., Massawudu, L.M., Pereko, K.K.A., Yeboah-Nkrumah, A., Amevinya, G.S., Nanema, S., Odame, E.A., Agyekum, P.A., Mpereh, M., and Sandaare, S. (2023). Making food-related health taxes palatable in sub-Saharan Africa: lessons from Ghana. BMJ Global Health, 8(Suppl 8), e012154.

34. Ghartey, A.B. (2010). Nutrition Policy and Programs in Ghana: The Limitation of a Single Sector Approach. Health, Nutrition and Population Discussion Paper. World Bank. http://hdl.handle.net/10986/27590.

35. Buckingham, D. (2003). Food Labelling Law in Ghana. https://idl-bnc-idrc.dspacedirect.org/server/api/core/bitstreams/9b7e6c44-c0aa-4a22-9862-4b6c23fd1020/content.

36. Ministry of Health. (2012). National Policy for the Prevention and Control of Chronic Non-Communicable Diseases in Ghana. Republic of Ghana.

37. Ministry of Health. (2022). National Policy: Non-Communicable Diseases. Republic of Ghana.

38. Ghana ministerial consensus statement on nutrition. (2019). Global Panel on Agriculture and Food Systems for Nutrition. https://www.glopan.org/news/ghana-ministerial-consensus-statement-on-nutrition/.

39. Verger, E.O., Savy, M., Martin-Prevel, Y., Coates, J., Frongillo, E., Neufeld, L., Saha, K., Hayashi, C., Holmes, B., Vogliano, C., Borghi, E., and Branca, F. (2023). Healthy diet metrics: a suitability assessment of indicators for global and national monitoring purposes. Geneva: World Health Organization. https://www.who.int/publications/i/item/9789240072138.

40. Seligman, H.K., Levi, R., Adebiyi, V.O., Coleman-Jensen, A., Guthrie, J.F., and Frongillo, E.A. (2023). Assessing and Monitoring Nutrition Security to Promote Healthy Dietary Intake and Outcomes in the United States. Annual Review of Nutrition, 43, 409-429.

41. World Health Organization and Food and Agriculture Organization of the United Nations. (2003). Diet, Nutrition and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation. WHO Technical Report Series No. 916. Geneva: WHO. https://iris.who.int/server/api/core/bitstreams/c4f12939-5f55-4b75-b6f9-283024956b3f/content.

42. Barrett, E.M., Afrin, H., Rayner, M., Pettigrew, S., Gaines, A., Maganja, D., Jones, A., Mozaffarian, D., Beck, E.J., Neal, B., Taylor, F., Munn, E., and Wu, J.H. (2024). Criterion validation of nutrient profiling systems: a systematic review and meta-analysis. Am J Clin Nutr, 119(1), 145-163.

43. Arambepola, C., Scarborough, P., and Rayner, M. (2008). Validating a nutrient profile model. Public Health Nutrition, 11(4), 371-378.

44. Drewnowski, A. (2010). The Nutrient Rich Foods Index helps to identify healthy, affordable foods. Am J Clin Nutr, 91(4), 1095s-1101s.

45. Monteiro, C.A., Levy, R.B., Claro, R.M., Castro, I.R., and Cannon, G. (2010). A new classification of foods based on the extent and purpose of their processing. Cad Saude Publica, 26(11), 2039-49.

46. Poon, T., Labonté, M., Mulligan, C., Ahmed, M., Dickinson, K.M., and L'Abbé, M.R. (2018). Comparison of nutrient profiling models for assessing the nutritional quality of foods: a validation study. Br J Nutr, 120(5), 567-582.

47. World Health Organization. (2022). Use of nutrient profile models for nutrition and health policies: meeting report on the use of nutrient profile models in the WHO European Region, September 2021. Copenhagen: WHO Regional Office for Europe. https://www.who.int/europe/publications/i/item/WHO-EURO-2022-6201-45966-66383.

48. Drewnowski, A., Amanquah, D., and Gavin-Smith, B. (2021). Perspective: How to Develop Nutrient Profiling Models Intended for Global Use: A Manual. Advances in Nutrition, 12(3), 609-620.

49. Monteiro, C.A., Cannon, G., Lawrence, M., Costa Louzada, M.L., and Pereira Machado, P. (2019). Ultra-processed foods,diet quality, and health using the NOVA classification system. Rome, FAO. https://openknowledge.fao.org/server/api/core/bitstreams/5277b379-0acb-4d97-a6a3-602774104629/content.

50. Laar, A. (2021). The role of food environment policies in making unhealthy foods unattractive and healthy foods available in Africa. eClinicalMedicine, 36.

51. World Health Organization. (1981). International Code of Marketing of Breast-Milk Substitutes (WHA Resolution 34.22). WHO. https://www.who.int/publications/i/item/9241541601.

52. World Health Organization. (2016). Ending inappropriate promotion of foods for infants and young children (WHA Resolution 69.9). WHO. https://apps.who.int/gb/ebwha/pdf_files/wha69/a69_r9-en.pdf.

53. The HD4HL Project. (2022). The Multi-Stakeholder Technical Task Team (M3T) of the HD4HL Project (2022). Technical Report #1 of the HD4HL Project, Accra, Ghana.

54. Nanema, S., Mialon, M., Adjei, A.P., Hamel, V., and Laar, A. (2025). Evaluation of an intervention limiting food industry influence on public food policy processes in Ghana. Health Promotion International, 40(4).

55. Tandoh, A., Thow, A., Apprey, C., Vandevijvere, S., and Laar, A. (2025). Power, politics and policy: The political economy of food-based policy reform in Ghana (Unpublished report).

56. Ewul, E., Dangbey, D., Mahomedy, S., Amevinya, G.S., Robertson, K., Hayford, E., and Laar, A. (2025). Unlocking legal pathways for food labelling and marketing regulation in Ghana: A legal feasibility analysis (Unpublished report).

57. Odame, E.A., Ayisi, L.A., Amevinya, G.S., Akasoe, B.A., Gyamfi, I., Mpereh, M., and Laar, A. (2025). Moving from siloed to integrated policy action: An analysis of Ghana's food-related policies for coherence and double-duty action (Unpublished report).

58. World Health Organization. (2017). Draft Approach for the Prevention and Management of Conflicts of Interest in the Policy Development and Implementation of Nutrition Programmes at Country Level. Decision-Making Process and Tool. Geneva: WHO. https://cdn.who.int/media/docs/default-source/nutritionlibrary/safeguarding-against-possible-conflicts-of-interest-in-nutrition-programmes/nutrition-introductory-paper.pdf?sfvrsn=3fa31e18_2.

59. Kraak, V.I. (2022). Advice for Food Systems

Governance Actors to Decide Whether and How to Engage With the Agri-Food and Beverage Industry to Address Malnutrition Within the Context of Healthy and Sustainable Food Systems; Comment on "Challenges to Establish Effective Public-Private Partnerships to Address Malnutrition in All Its Forms". International Journal of Health Policy and Management, 11(3), 401-406.

60. Laar, A., Sommers, N., Frank, T., Nanema, S., Milani, P., and Swart, E. (2022). Identifying potentially relevant nutrient profiling models (NPMs) for consideration by the HD4HL Nutrient Profiling sub-committee. Technical Report #2 of the HD4HL Project, Accra, Ghana.

61. Santos, M., Rito, A.I., Matias, F.N., Assunção, R., Castanheira, I., and Loureiro, I. (2021). Nutrient profile models a useful tool to facilitate healthier food choices: A comprehensive review. Trends in Food Science & Technology, 110, 120-131.

62. Abdul-Haq, Z. (2022). Developing a Nutrient Profiling Model for Categorising Food and Beverages in Ghana: A Multimethod Study. (Doctoral dissertation, University of Sheffield).

63. Health Star Rating System. (2014). https://www.healthstarrating.gov.au/.

64. Santé Publique France. (2017). Nutri-Score. https://www.santepubliquefrance.fr/determinants-de-sante/nutrition-et-activite-physique/articles/nutri-score.

65. Fulgoni, V.L., 3rd, Keast, D.R., and Drewnowski, A. (2009). Development and validation of the nutrient-rich foods index: a tool to measure nutritional quality of foods. J Nutr, 139(8), 1549-54.

66. Mozaffarian, D., El-Abbadi, N.H., O'Hearn, M., Erndt-Marino, J., Masters, W.A., Jacques, P., Shi, P., Blumberg, J.B., and Micha, R. (2021). Food Compass is a nutrient profiling system using expanded characteristics for assessing healthfulness of foods. Nature Food, 2(10), 809-818.

67. Choices International Foundation. (2022). International Choices 5-level criteria - A global standard to support multiple food system actions. https://www.choicesprogramme.org/dist/uploads/International_Choices_criteria_version_2022_-_20230509_DEF.pdf.

68. Eyeson, K.K. and Ankrah, E.K. (1975). Composition of foods commonly used in Ghana. Council for Scientific and Industrial Research (CSIR), Food Research Institute.

69. Vincent, A., Grande, F., Compaoré, E., Amponsah Annor, G., Addy, P.A., Aburime, L.C., Ahmed, D., Bih Loh, A.M., Dahdouh Cabia, S., Deflache, N., Dembélé, F.M., Dieudonné, B., Edwige, O.B., Ene-Obong, H.N., Fanou Fogny, N., Ferreira, M., Omaghomi Jemide, J., Kouebou, P.C., Muller, C., Nájera Espinosa, S., Ouattara, F., Rittenschober, D., Schönfeldt, H., Stadlmayr, B., van Deventer, M., Razikou Yiagnigni, A., and Charrondière, U.R. (2020). FAO/INFOODS Food Composition Table for Western Africa (2019) User Guide & Condensed Food Composition Table. Rome, FAO. https://openknowledge.fao.org/server/api/core/bitstreams/51ca3ee4-9bd4-4077-b746-93cecd34b2c0/content.

70. Astrup, A., Magkos, F., Bier, D.M., Brenna, J.T., de Oliveira Otto, M.C., Hill, J.O., King, J.C., Mente, A., Ordovas, J.M., Volek, J.S., Yusuf, S., and Krauss, R.M. (2020). Saturated Fats and Health: A Reassessment and Proposal for Food-Based Recommendations: JACC State-of-the-Art Review. J Am Coll Cardiol, 76(7), 844-857.

71. Mozaffarian, D. and Ludwig, D.S. (2015). The 2015 US Dietary Guidelines: Lifting the Ban on Total Dietary Fat. JAMA, 313(24), 2421-2422.

72. Monteiro, C.A., Cannon, G., Levy, R.B., Moubarac, J.-C., Louzada, M.L.C., Rauber, F., Khandpur, N., Cediel, G., Neri, D., Martinez-Steele, E., Baraldi, L.G., and Jaime, P.C. (2019). Ultra-processed foods: what they are and how to identify them. Public Health Nutrition, 22(5), 936-941.

73. Popkin, B.M. and Ng, S.W. (2022). The nutrition transition to a stage of high obesity and noncommunicable disease prevalence dominated by ultra-processed foods is not inevitable. Obes Rev, 23(1), e13366.

74. Lara-Arevalo, J., Laar, A., Chaparro, M.P., and Drewnowski, A. (2024). Nutrient-Dense African Indigenous Vegetables and Grains in the FAO Food Composition Table for Western Africa (WAFCT) Identified Using Nutrient-Rich Food (NRF) Scores. Nutrients, 16(17), 2985.

75. World Health Organization and United Nations Children's Fund. (2023). Taking action to protect children from the harmful impact of food marketing: a child rights-based approach. Geneva: WHO and UNICEF. https://www.who.int/publications/i/item/9789240047518.

76. Freudenberg, N. (2014). Lethal but legal: corporations, consumption, and protecting public health. Oxford University Press.

77. Palmedo, P.C., Dorfman, L., Garza, S., Murphy, E., and Freudenberg, N. (2017). Countermarketing Alcohol and Unhealthy Food: An Effective Strategy for Preventing Noncommunicable Diseases? Lessons from Tobacco. Annu Rev Public Health, 38, 119-144.

78. Jacobs, D.R. and Tapsell, L.C. (2007). Food, Not Nutrients, Is the Fundamental Unit in Nutrition. Nutrition Reviews, 65(10), 439-450.

79. Scarborough, P., Arambepola, C., Kaur, A., Bhatnagar, P., and Rayner, M. (2010). Should nutrient profile models be 'category specific' or 'across-the-board'? A comparison of the two systems using diets of British adults. Eur J Clin Nutr, 64(6), 553-60.

09

APPENDICES

9. APPENDICES

APPENDIX 1. THE GHANA NUTRIENT PROFILING SYSTEM SUB-COMMITTEE

Name	Institution	Designation
1. Prof. Amos Laar	University of Ghana	Chair
2. Mr. Percy A. Adomako	Food and Drugs Authority	Co-Chair_
3. Ms. Emma Ofori Agyeman	Ministry of Health	Member
4. Ms. Paulina Addy	Ministry of Food and Agriculture (WIAD)	Member_
5. Mrs. Mary Mpereh	National Development Planning Commission	Member_
6. Prof. Richmond Aryeetey	University of Ghana	Member
7. Prof. Paul Amuna	University Of Health And Allied Sciences	Member
8. Prof. Reginald Annan	Kwame Nkrumah University of Science and Technology	Member
9. Prof. Francis Amagloh	University for Development Studies	Member_
10. Prof. Paul Armah Aryee	University for Development Studies	Member
11. Prof. Charles Tortoe	CSIR/Food Research Institute	Member
12. Prof. Alexander Dodoo	Ghana Standards Authority	Member
13. Prof. Matilda Asante	University of Ghana	Member
14. Prof. Kingsley Pereko	University of Cape Coast	Member
15. Dr. Peter Peprah	Ghana Statistical Services	Member
16. Dr. Godfred Egbi	University of Ghana/ Noguchi Memorial Institute	Member
17. Dr. Rose Omari	Council for Scientific and Industrial Research- STEPRI	Member
18. Dr. Gloria Folson	University of Ghana/ Noguchi Memorial Institute	Member
19. Mr. Daniel Amanquah	Sight and Life	Member_
20. Mr Mark Kojo Atuahene	Ministry of Health - Ghana	Member_
21. Ms. Veronica Quartey	Nutrition Department, Ghana Health Service	Member_
22. Mr. Benjamin Akoto	Consumer Protection Agency	Member_
INTERNATIONAL EXPERTS		
23. Dr. Melissa Mialon	Trinity Business School, Trinity College Dublin, Ireland	Expert
24. Dr. Zakia Abdul-Haq	University of Sheffield, UK	Expert
25. Prof. Anne-Marie Thow	The University of Sydney, Australia	Expert
26. Dr. Hanna Bekele	WHO AFRO	Expert

Name	Institution	Designation
27. Prof. Rina Swart	University of the Western Cape, South Africa	Expert
28. Dr. Herbert Smorenburg	Choices International Foundation	Expert
29. Prof. Lana Vanderlee	Laval University	Expert
30. Dr. Tamryn Frank	University of the Western Cape, South Africa	Expert
31. Mr. Greg Hallen	IDRC, Canada	Expert
32. Julia Reedy Sharib	Tufts University, USA	Expert
33. Barrett Eden	Tufts University, USA	Expert
34. Jeffrey Blumberg	Tufts University, USA	Expert
35. Natalie Sommers	Tufts University, USA	Expert
36. Shu Wen Ng	University of North Carolina, Chapel Hill, USA	Expert

APPENDIX 2. HD4HL PROJECT ADVISORY AND COORDINATION COMMITTEES

Name	Institution	Designation
ADVISORY COMMITTEE		
1. Prof. Anna Lartey	Department of Nutrition and Food Science, UG	Chair
2. Prof. Ama de Graft-Aikins	Regional Institute for Population Studies (RIPS), UG	Member
3. Prof. Adam Drewnowski	University of Washington, Seattle , USA	Member
4. Prof. Karen Hofman	WITS School of Public Health, South Africa	Member
5. Prof. Dariush Mozaffarian	Tufts University, USA	Member
6. Mr. Peiman Milani	Director, Food Initiative. The Rockefeller Foundation	Member
7. Mr. Kwabena Boadu Oku-Afari	Chief Director, Ministry of Health, Ghana	Member
8. Mrs. Delese Mimi Darko	Chief Executive Officer, Food and Drugs Authority, Ghana	Member
9. Dr. Kodjo Esseim Mensah-Abrampa	Director-General, National Development Planning Commission, Ghana	Member
10. Mr. Patrick Nomo	Chief Director, Ministry of Finance and Economic Planning	Member
11. Prof. Amos Laar	School of Public Health University of Ghana	Rep of HD4HL Project
HD4HL PROJECT CORDINATION TEAM		
1. Prof. Amos Laar	University of Ghana	Project Lead
2. Ms. Emma Ofori Agyeman	Ministry of Health	MOH-lead
3. Hon Dr Sebastian N. Sandaare	Parliament of Ghana	CAPHA-lead
4. Mr. Percy A. Adomako	Food and Drugs Authority	FDA-lead
5. Ms. Mary Mpereh	National Development Planning Commission	NDPC-lead
6. Prof. Nana Akua Anyidoho	University of Ghana	Gender Expert
7. Mr. Gideon Amevinya	University of Ghana	Project Staff
8. Ms. Annabel Yeboah-Nkrumah	University of Ghana	Project Staff
9. Ms. Akua Tandoh	University of Ghana	Project Staff
10. Mr. Silver Nanema	University of Ghana	Project Staff
11. Ms. Lila Karen Amponsah	National Development Planning Commission	Project Staff
12. Ms. Phyllis Parbey	National Development Planning Commission	Project Staff
13. Mr Kwakye Kontor	Ministry of Health	Project Staff
14. Mr. Peter Korto	Ministry of Health	Project Staff
15. Ms. Gifty Aidoo	Food and Drugs Authority	Project Staff

APPENDIX 3A. DOMAINS AND ATTRIBUTES OF THE FCS INCLUDED IN THE GHANA NPS

Domain, details	Attribute	Notes
Nutrient Ratios Average of all attributes (half weighting for dairy unsat:sat ratio)	Unsaturated: Saturated fat	Limiting saturated fat mentioned in the **HD4HL identification of NPM** document and FBDG
	Fibre: Carb	Fibre mentioned in **HD4HL identification of NPM** document
	Potassium: Sodium	Sodium and potassium specifically mentioned in the **HD4HL identification of NPM** document
Vitamins Average of top 5 contributors, full weightings for all	Vitamin A	Important as deficiency still prevalent and a focus of supplementation and fortification programs.
	Thiamin (B1)	B-vitamins are likely to be important, included in fortification program and studies have shown frequently low intakes.
	Riboflavin (B2)	
	Niacin (B3)	
	Vitamin B6	
	Folate (B9)	Important as deficiency still prevalent and a focus of supplementation and fortification programs. Specifically mentioned in **HD4HL identification of NPM** document
	Cobalamin (B12)	Important as deficiency still prevalent
	Vitamin C	
	Vitamin D	
	Vitamin E	Specifically mentioned in the **HD4HL identification of NPM** document
	~~Vitamin K~~	Do not include due to gaps in food composition data
	~~Choline~~	Do not include due to gaps in food composition data
Minerals Average of top 5 contributors, full weightings for all	Calcium	Specifically mentioned in the **HD4HL identification of NPM** document
	Phosphorus	
	Magnesium	Specifically mentioned in the **HD4HL identification of NPM** document
	Iron	Important as included in supplementation and fortification programs, anaemia is prevalent
	Zinc	Specifically mentioned in the **HD4HL identification of NPM** document
	~~Copper~~	Do not include due to gaps in food composition data
	Selenium	Include
	Sodium	Specifically mentioned in the **HD4HL identification of NPM** document, limit salt/sodium mentioned in FBDG
	Potassium	Specifically mentioned in the **HD4HL identification of NPM** document
	Iodine	Important as deficiency still prevalent

Domain, details	Attribute	Notes
Food-based ingredients Sum of attributes, full weight for all	Fruits (not including juices)	Featured in FBDG
	Fruits dried	FBDG – "Processed fruit (dried, juiced etc) can be substitutes when whole fruit not in season but prioritise whole fruit"
	Non-starchy vegetables	Featured in FBDG. Consider relevance of colourful tubers and roots which are starchy but are good sources of vitamin A. Many studies from Ghana actually separate vitamin-A source vegetables/fruits and others.
	Non-starchy vegetables dried	Featured in FBDG
	Beans & legumes	Featured in FBDG
	Whole grains	Featured in FBDG. Consider the importance of fortified wheat flour, which (need to confirm) would not include wholemeal flours? Data sources suggest that actual fortification of wheat flour is quite low though (~13%).
	Nuts & seeds	Featured in FBDG
	Seafood	Featured in FBDG
	Yoghurt	Mentioned in FBDG text but emphasised less in recommended food groups (consumed less commonly?), calcium does appear to be an issue in diets though so perhaps some inclusion of dairy is worthwhile
	Plant oils	Featured in FBDG Consider the importance of emphasising vitamin A fortified oils? My understanding is 95% of vegetable oil is fortified but public understanding is low, so may just add confusion.
	Refined carbs (added sugar + refined grain)	Consider white starchy roots and tubers which are commonly a staple as refined grains might be here.
	Red or processed meat	Consider importance of unprocessed red meat, which is featured in FBDG (lean versions). "For meats and poultry, choose lean meat cuts, and limit eating fatty meat. Limit intake of offals and skins. Limit intakes of processed meats. Limit eating of animal source foods that have been preserved with additives (eg salt, oil, and chemicals that makes meat have red/ pink color, etc)." the GNR on Ghana does suggest National Intakes of Fish and red meat are exceeding targets, but energy and protein are still priorities in some cases, so worth discussing further.

Domain, details	Attribute	Notes
Additives Average of attributes, full weight for added sugar and nitrites, half weight for others (which are also binary scored yes/no presence)	Added sugar	Featured throughout FBDG
	Nitrites / **dyes/colours**	FBDG: "Limit eating of animal source foods that have been preserved with additives (eg salt, oil, and chemicals that makes meat have red/pink color, etc)."
	Artificial sweeteners/ flavours/	Avoiding artificial sweetener is mentioned in the **HD4HL identification of NPM** document
	Partially hydrogenated oils	Include
	Interesterified or hydrogenated oils	Include
	High fructose corn syrup	Include
	Monosodium glutamate (MSG)	Include
Processing Average of attributes Full weight for NOVA, half for fermentation and frying (frying is binary yes/no)	NOVA	Include
	Fermentation	Include
	Frying	FBDG: "Limit deep frying of foods; whenever possible, choose other cooking methods like boiling, baking, grilling, and smoking, over frying of foods"
Specific lipids Average of top 3 attributes, entire domain is half weighted, full weight to all attributes except MCFA (half weighted)	Alpha-linolenic acid (ALA)	Depending on data availability or imputation feasibility
	EPA + DHA	Depending on data availability or imputation feasibility
	Medium-chain fatty acids (MCFA)	Depending on data availability or imputation feasibility
	Dietary cholesterol	Include
	Trans fats	FBDG: "Limit eating foods that contain Trans fats. Read labels on pre-packaged foods in order to identify and select foods that have less than 1% Trans fats"
Fibre/Protein Average of attributes, protein is half weighted.	Total fibre	Diets in Ghana are much higher in fibre than US, but fibre is still specifically mentioned in the **HD4HL identification of NPM** document
	Total protein	Specifically mentioned in the **HD4HL identification of NPM** document
~~**Phytochemicals**~~ ~~Average of attributes, entire domain is half weighted.~~ -	~~Total flavonoids~~	Do not include due to gaps in food composition data
	~~Total carotenoids~~	Do not include due to gaps in food composition data

APPENDIX 3B. GHANA NPS HOLISTIC FOOD SCORING FRAMEWORK

An operational guide for computing, submitting, verifying and interpreting Ghana Nutrient Profiling scores

1. Purpose of this Appendix

This appendix explains how the holistic Ghana Nutrient Profiling System (Ghana NPS) score should be generated, documented and checked. It is written for regulators, food companies, policy implementers, civil society users and non-specialist readers.

The Ghana NPS has two components. First, foods are checked against food category-specific mandatory nutrient thresholds. Foods that exceed one or more thresholds receive the relevant front of package label(s). Second, foods that do not exceed the warning thresholds proceed to holistic scoring, which gives a broader picture of their overall healthfulness.

The holistic score is adapted from the Tufts Food Compass nutrient profiling model. Food Compass assesses foods, beverages and mixed meals using multiple domains, including nutrient ratios, vitamins, minerals, food-based ingredients, additives, processing, specific lipids, fiber/protein. The Ghana adaptation simplifies this approach for national policy use and scales the final score from 1 to 10.

2. The steps to generate holistic nutrient profiling scores using the Ghana NPS

The Ghana NP score is generated using the official Ghana NPS scoring worksheet. The worksheet shows every input, every domain score, the weight applied and the final score

Stage	What happens
Step 0. Confirm scope	Confirm that the item is a food or food product covered by the Ghana NPS. Exclude products governed by other standards, such as breast-milk substitutes, special medical foods, supplements, alcohol and other excluded products.
Step 1. Assign the product to one of the seven Ghana NPS food categories	Assign the product to one of the seven Ghana NPS food categories in Tables 1 and 3. Apply the nutrient cut-off points for that category. If the product exceeds one or more thresholds, it receives the relevant warning label(s).

Stage	What happens
Step 2. Decide whether scoring is needed	Foods that exceed one or more thresholds are already classified for warning-label purposes. Foods that do not exceed thresholds may proceed to holistic scoring, especially when considering positive logos, procurement priority, subsidy eligibility or healthfulness communication.
Step 3. Enter food composition data into the Ghana Nutrient Profiling Scoring Worksheet (see details in sub-steps 3.1 through 3-9 below)	Use the official Ghana **Nutrient Profiling Scoring Worksheet** or calculator. Enter verifiable label, food composition data or ingredients in the worksheet.
Step 4. Submit populated worksheet and results to FDA	Food companies submit the calculation sheet and supporting evidence to FDA or the designated authority to verify the inputs, reruns the score and audits products where needed.

Step 3: Collect data for food attributes

Step 3.1 Identify and assign each food item to its appropriate category (e.g., grains, beverages, dairy) using the Ghana NPS holistic scoring food classification framework.

Step 3.2 Extract nutrient or food composition data from the product's labeling/nutrient declaration panel or food composition tables[5], and compute nutrient ratios. For key components, refer to the NPS domains and attributes.

Step 3.3 Standardization and adjustment for food state
Calculate nutrient values for foods as sold or as reconstituted (e.g., powdered drinks). Convert non-standard serving sizes to a standardized measure to ensure comparability across products. For instance, per 100 kcal or per 100 g, per 100 mL as applicable[6].

Step 3.4: Scoring and weighting of attributes across domains

This step is automated in the Ghana NPS algorithm[7] (worksheet). Each food item is evaluated using the eight domains (8 domains and 49 attributes of the Ghana NPS), with points assigned based on weighted components. (Positive) Nutrients and food components to encourage. Dietary fiber, protein, vitamins, and unsaturated fats) receive positive scores. Food components such as whole grains (that are not ultra-processed), fresh produce, and fermented foods, also receive favorable scores. (Negative) Nutrients and food components

5 The Ghana FDA and the NPS data team maintains a database of food composition of over 6,000 foods. This may be consulted to complete this step.
6 The Ghana FDA NPS data database of over 6,000 foods are all standardized. This may be consulted to complete this step.
7 The Ghana NPS has a mathematical algorithm. This will be shared with actors who need to use it for this purpose.

to limit. Points are deducted for excessive levels of nutrients of public health concern, such as sodium: Scores decrease above a 1 mg/kcal ratio; free sugars (products exceeding 10% of total energy from free sugars (5% for beverages) lose points. Saturated and trans fats: Foods with >10% energy from saturated fats or >1% energy from trans fats receive deductions.

Appendix 3A has details of the 8 domains and 49 attributes. The 8 domains are summarized below

Finally, for each food, weighted domain scores are combined and rescaled to produce a final Ghana NP score from 1 to 10.

3. Interpretation of the Ghana nutrient profiling holistic scores

Ghana NP score	Interpretation	Policy implications	Important caution
7.0-10.0	Food to encourage	May be considered for positive logo, procurement priority or targeted support, if it also has no warning label and meets all other eligibility criteria.	A high score does not override a warning threshold. If a product exceeds a warning threshold, the warning applies.
3.1-6.9	Food to consume in moderation	Will not carry a warning label if it does not exceed the category-specific thresholds. It will not automatically receive a positive label.	Some foods in this range may still be useful in diets, depending on context and quantity.
1.0-3.0	Food to limit or discourage	Generally, not eligible for positive logos, procurement priority or subsidies. It will carry a warning labels only if the category-specific thresholds are exceeded.	Some foods in this range may still be consumed, depending on context and quantity.

4. What food companies must submit

A company applying a Ghana NP score should submit a scoring file to the FDA. The minimum file should contain:

a. a completed Ghana NP scoring worksheet showing all entered values and the final score;

b. a clear image or copy of the full product label, including the nutrition declaration and ingredient list;

c. a statement of the assigned Ghana NPS food category and the reason for that category;

d. evidence for values not shown on the label, such as laboratory analysis, formulation records or food composition table references;

e. a declaration of added sugar, non-sugar sweeteners, artificial colours/flavours, hydrogenated oils, trans fat sources and other relevant additives;

f. a signed declaration that the information submitted is accurate and can be audited.

5. Verification and enforcement

The FDA or the designated national authority will verify company-declared scores once submitted.

6. What to do when information is missing

Situation	Recommended rule
A nutrient value required for scoring is missing.	Use a validated food composition database or request laboratory analysis. If the missing value could materially change eligibility for a logo or policy benefit, do not approve until verified, or consider it as having exceeded a threshold.
Ingredient information is incomplete.	Request a full ingredient list. If the product is packaged and no full ingredient list is provided, it should not be eligible for a positive logo.
The product category is unclear.	Use the closest comparable category based on composition and customary use, document the reason, and refer difficult cases for technical review.
The company disputes the score.	Allow appeal only with evidence: laboratory data, complete formulation records, corrected label information or documented scoring error.
The product is reformulated.	The score must be recalculated and resubmitted. Previous approval should not automatically apply to reformulated products.

APPENDIX 4. THE GHANA NPS FOOD GROUP AND DISTRIBUTIONS STATISTICS

FOOD GROUP	Ghana NPS food categories	N (%)	% of eligible foods with information on Sat Fat	% of eligible foods with information on Total Sugar	% of eligible foods with information on Sodium	% of eligible foods declaring TFAs	% of eligible food designated as NOVA4	% with NP score ≤3.0 foods to discourage	% with NP score 3.1–6.9 foods to consume in moderation	% with NP score ≥7.0 foods to encourage[8]
All Groups, all categories			5509 (86.0%)	5985 (93.5%)	3604 (56.3%)	2879 (45.0%)	3957 (61.8%)	3002 (46.9%)	2057 (32.1%)	1345 (21.0%)
GROUP 1 - Beverages 1184 (18.5%)	1a. Juices (e.g. 100% fruit/vegetable juice)	146 (2.3%)	**126**	**133**	**65**	**45**	**146**	**62**	**39**	**45**
	1b. Plain Milk and dairy-based drinks	200 (3.1%)	**182**	**189**	**58**	**44**	**200**	**75**	**61**	**64**
	1c. Water-based drinks (soft drinks, flavored water, powdered drinks)	723 (11.3%)	**618**	**652**	**279**	**155**	**723**	**359**	**186**	**178**
	1d. Coffee, tea, herbal infusions	55 (0.9%)	**51**	**49**	**14**	**7**	**55**	**37**	**11**	**7**
	1e. Cereal, legumes, tree nut-based beverages	60 (0.9%)	**51**	**48**	**28**	**11**	**60**	**27**	**17**	**16**

8 granted such foods are not designated to bear a front of pack warning label, or do not exceed any of the thresholds referred to above

FOOD GROUP	Ghana NPS food categories	N (%)	% of eligible foods with information on Sat Fat	% of eligible foods with information on Total Sugar	% of eligible foods with information on Sodium	% of eligible foods declaring TFAs	% of eligible food designated as NOVA4	% with NP score ≤3.0 foods to discourage	% with NP score 3.1–6.9 foods to consume in moderation	% with NP score ≥7.0 foods to encourage[8]
GROUP 2 - Sweet Foods 1485 (23.2%)	2a. Chocolate, confectionery, energy bars, sweet toppings	730 (11.4%)	**630**	**653**	**338**	**164**	**730**	**343**	**300**	**87**
	2b. Cakes, pastries, sweet bakery products	577 (9.0%)	**515**	**539**	**230**	**135**	**577**	**306**	**183**	**88**
	2c. Frozen dairy desserts and edible ices	82 (1.3%)	**63**	**74**	**20**	**11**	**82**	**33**	**22**	**27**
	2d Other dairy-based desserts	96 (1.5%)	**77**	**83**	**25**	**22**	**96**	**68**	**20**	**8**
GROUP 3 - Savory Snacks and processed foods 1497 (23.4%)	3a. Ready-to-eat savory snacks	442 (6.9%)	**364**	**393**	**198**	**116**	**442**	**208**	**152**	**82**
	3b Processed meat, poultry, fish	282 (4.4%)	**245**	**258**	**104**	**50**	**282**	**102**	**113**	**67**
	3c. Solid-form soybean products (e.g. tofu)	8 (0.1%)	**8**	**8**	**2**	**4**	**8**	**3**	**4**	**1**
	3d. Sauces, dips, dressings	765 (11.9%)	**645**	**691**	**260**	**144**	**765**	**349**	**215**	**201**

FOOD GROUP	Ghana NPS food categories	N (%)	% of eligible foods with information on Sat Fat	% of eligible foods with information on Total Sugar	% of eligible foods with information on Sodium	% of eligible foods declaring TFAs	% of eligible food designated as NOVA4	% with NP score ≤3.0 foods to discourage	% with NP score 3.1–6.9 foods to consume in moderation	% with NP score ≥7.0 foods to encourage[8]
GROUP 4 - Composite/ Prepared Meals 245 (3.8%)	4a Composite foods (e.g., ready meals, filled pastries, sandwiches)	245 (3.8%)	**202**	**217**	**103**	**47**	**245**	**94**	**83**	**68**
GROUP 5 - Dairy, Dairy Analogues and Oils 255 (4.0%)	5a Cheese and analogues	35 (0.5%)	**28**	**32**	**6**	**2**	**35**	**3**	**9**	**23**
	5b Butter, margarine, oils and fat emulsions	220 (3.4%)	**186**	**200**	**77**	**47**	**220**	**113**	**62**	**45**
GROUP 6 - Staple Grains, Cereals, and other flour products 955 (14.9%)	6a Breads and crisp breads	102 (1.6%)	**88**	**95**	**47**	**17**	**102**	**42**	**43**	**17**
	6b Breakfast cereals	378 (5.9%)	**336**	**344**	**129**	**78**	**378**	**147**	**135**	**96**
	6c Pasta, noodles, rice and grains	475 (7.4%)	**405**	**426**	**179**	**93**	**475**	**276**	**132**	**67**

FOOD GROUP	Ghana NPS food categories	N (%)	% of eligible foods with information on Sat Fat	% of eligible foods with information on Total Sugar	% of eligible foods with information on Sodium	% of eligible foods declaring TFAs	% of eligible food designated as NOVA4	% with NP score ≤3.0 foods to discourage	% with NP score 3.1–6.9 foods to consume in moderation	% with NP score ≥7.0 foods to encourage[8]
GROUP 7 - Fruits, Vegetables, Pulses and other proteins 780 (12.2%)	7a Fresh/frozen meat, fish, poultry, seafood	17 (0.3%)	**15**	**16**	**5**	**3**	-	**4**	**12**	**1**
	7b Fresh/frozen fruits, vegetables, legumes, roots/ tubers	152 (2.4%)	**130**	**139**	**76**	**33**	-	**65**	**63**	**24**
	7c Processed fruits, vegetables, legumes and pulses	611 (9.5%)	**543**	**559**	**273**	**148**	**611**	**284**	**194**	**133**
	TOTAL		**5508**	**5798**	**2516**	**1376**	**6232**	**3000**	**2056**	**1345**

APPENDIX 5. PERFORMANCE OF THE GHANA NUTRIENT PROFILING SYSTEM ON 28,609 PACKAGED FOOD AND BEVERAGE PRODUCTS MARKETED IN SELECT AFRICAN COUNTRIES - BETWEEN 2020 AND 2023..

Identifying a Nutrient Profiling Model for Ghana

January 2026

A comparative study and implications for ultra processed food (UPF) regulatory policies

UNIVERSITY OF GHANA

Global Food Research Program
UNC-Chapel Hill

UNIVERSITY of the WESTERN CAPE

KEY FINDINGS

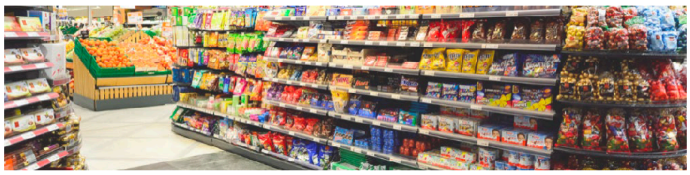
- The **WHO AFRO and proposed Ghana NPMs will have the largest share of products being non-compliant**
- **The South Africa (SA) FOPL and PAHO NPMs will have the lowest regulatory burden**
- The **Nutri-Score NPM could not be implemented on 23% of foods and 16% of beverages**, more than any other NPMs studied
- A considerable share of food and beverage products on the market in Ghana were **missing information on trans fats (54%), saturated fats (17%),** and **sodium (14%)**

RECOMMENDATIONS

- **Strengthen mandatory nutrition labeling to support effective implementation, enforcement and monitoring**
- Until labeling improves, policies will need to **assume that products that do not report targeted nutrient or ingredients are non-compliant**
- To lower the regulatory burden and to be aligned with policy goals, **exempt products from NPM policies if minimally processed**, or do not contain any added sweeteners, added sugars, added sodium, or added fats

Like many other countries in the African region, Ghana is experiencing a nutrition transition.[1] While food availability has increased in the region over the past several decades, **dietary diversity has worsened, with consumption of unhealthy fried foods and sweetened beverages becoming increasingly prevalent.**[1] As convenience foods and imported, **pre-packaged energy-dense food and beverage products replace traditional, mostly plant-based diets, non-communicable disease (NCDs) are becoming a growing concern.**[2] In 2016, the World Health Organization estimated that 43% of deaths in Ghana could be attributed to NCDs, up from 28% in 1990.[3,4] Of particular concern is hypertension, which is estimated to impact more than one in four Ghanaians and is among the top three risk factors driving poor health and mortality outcomes in the country.[4,5] At the same time, malnutrition remains the risk factor responsible for the most death and disability in Ghana.[5] One in five children are stunted and one in ten wasted, while a significant portion of women of reproductive age are vitamin deficient.[6] **Proactive action is needed to disrupt this double burden of malnutrition and improve diet and health outcomes in Ghana.**

Nutrient profile models (NPMs) are a tool used to design policies that discourage production and consumption of foods containing nutrients or ingredients of concern such as ultra-processed products. Like many African nations and countries around the world, Ghana is currently in the process of developing its own NPM. This brief will report on findings from a comparison study of NPMs being considered for use in Ghana.



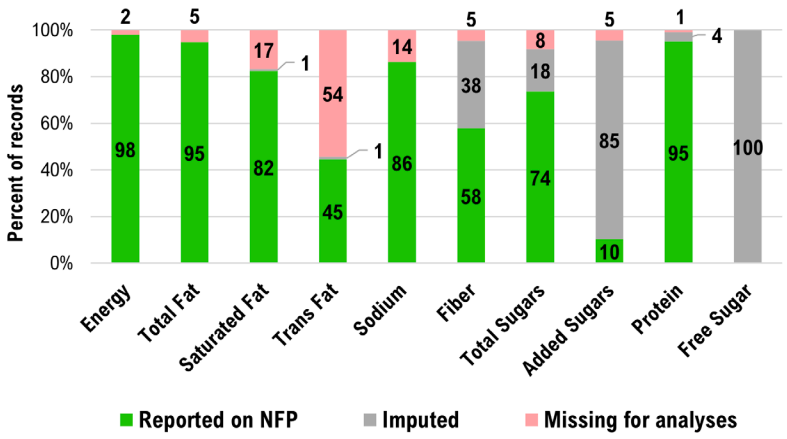
Methodology: Ghana, Kenya, Nigeria, Tanzania and South Africa have all identified nutrition policy priorities that require a NPM to inform practical policy implementation.[7-11] This study applied several NPMs proposed for use to a set of 28,609 packaged food and beverage products from 2020-2023 obtained from the Mintel Global New Product Database. Missing nutrient values were imputed where possible. Records were assessed on nutrition labeling information **(Figure 1)**, rates of product exemption and compliance with each NPM **(Figure 2)**, and compliance by NSS criteria inclusion **(Figure 3).** The NPMs studied included:

1) the proposed Ghana NPM (under development)[7,*]
2) the World Health Organization (WHO) Africa Region NPM (hereafter WHO AFRO)[12]
3) the Kenyan NPM[8]
4) the South African NPM for front-of-package labeling, with a free sugar criteria (hereafter SA FOPL)[13]
5) the Pan American Health Organization (PAHO) NPM[14]
6) Nutri-Score[15]

Brief descriptions of each NPM and their key characteristics are listed in **Table 1**.

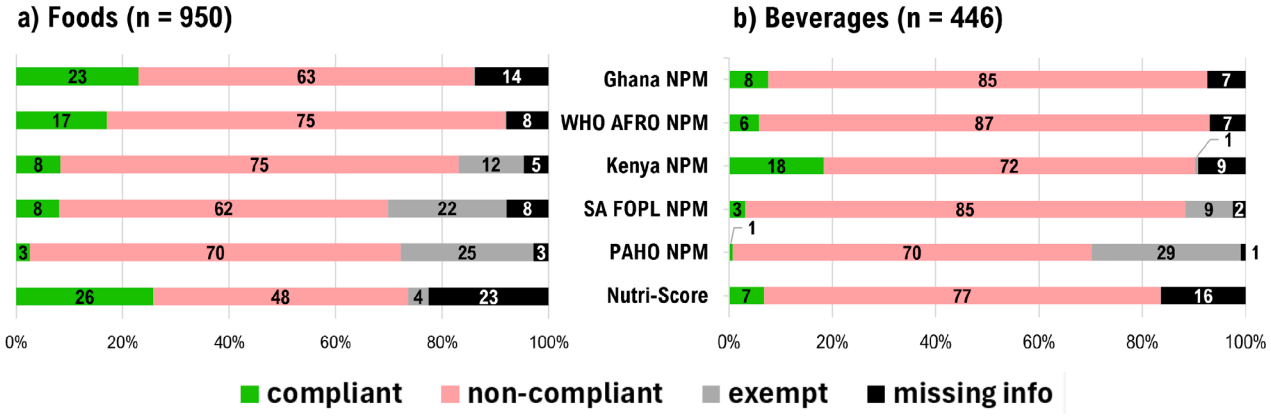
* The Ghana NPS applies a dual thresholding strategy, integrating nutrient-specific thresholding based on WHO guidelines, and a holistic scoring system based on the Food Compass guidelines. The component applied in this analysis is the nutrient-specific thresholding based on WHO guidelines.

FIGURE 1: AVAILABILITY OF NUTRITION INFORMATION AMONG PRODUCTS IN GHANA



A considerable share of products assessed in Ghana lacked nutrition label information on trans fat (54%), saturated fat (17%), and sodium (14%). Policies based on the Ghanian NPM should assume that products that do not report on targeted nutrients or ingredients are non-compliant. This approach will encourage improvements in nutrition labeling.

FIGURE 2: COMPLIANCE OF GHANIAN PRODUCTS BY NPM



Among those considered, the WHO AFRO NPM will have the largest share of products non-compliant (i.e. the most products subject to regulation), with 75% of foods and 87% of beverages in this sample of products in Ghana being non-compliant. The proposed Ghana NPM is aligned with the WHO AFRO for beverages but more relaxed for foods, of which 14% of food products in Ghana could not be assessed. Nutri-Score has the smallest share of products being non-compliant in part because Nutri-Score could not be applied to 23% of foods and 16% of beverage product records due to a lack of information on the package required to apply Nutri-Score. The higher proportion of compliance among product records assessed by Nutri-Score is in line with findings that score-based NPMs enable manufacturers to add certain "positive" nutrients to boost scores. This makes Nutri-Score weaker at identifying products with unhealthy levels of nutrients of concern.[16,17]

To lower the regulatory burden and to better align with policy goals, products with certain characteristics like being minimally processed, not containing any added sweetener, added sugar, added sodium or added fats should be exempt from regulations at this time.

FIGURE 3: NPM COMPLIANCE BY NUTRIENT

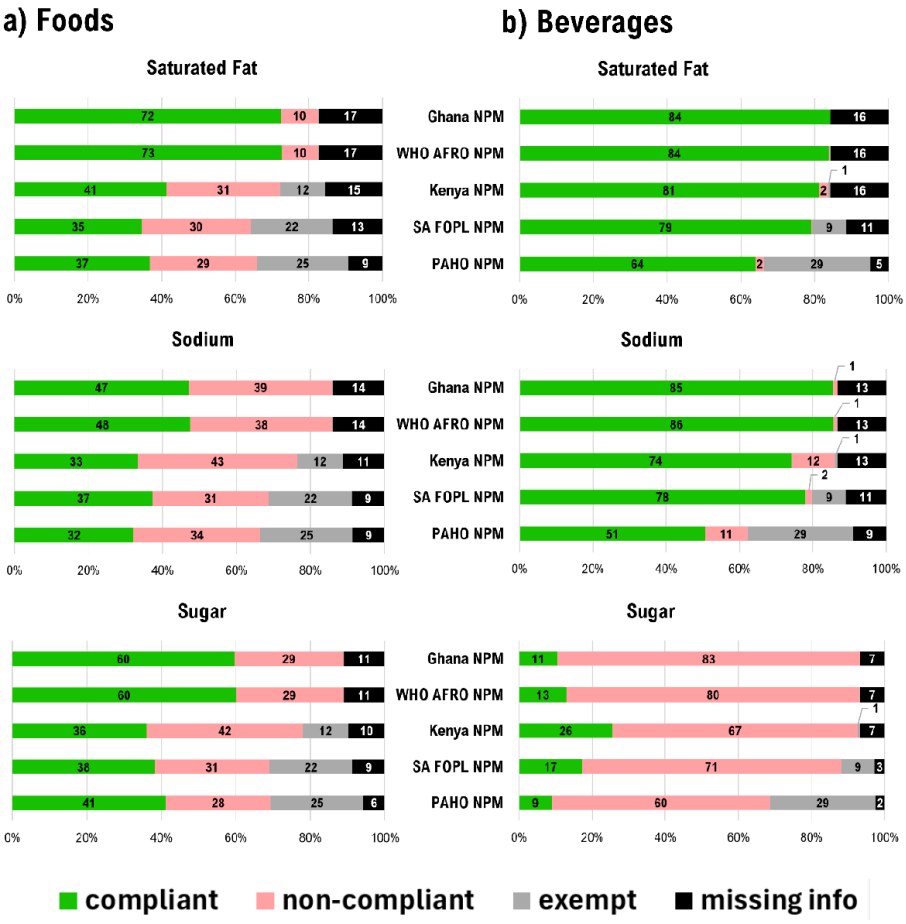
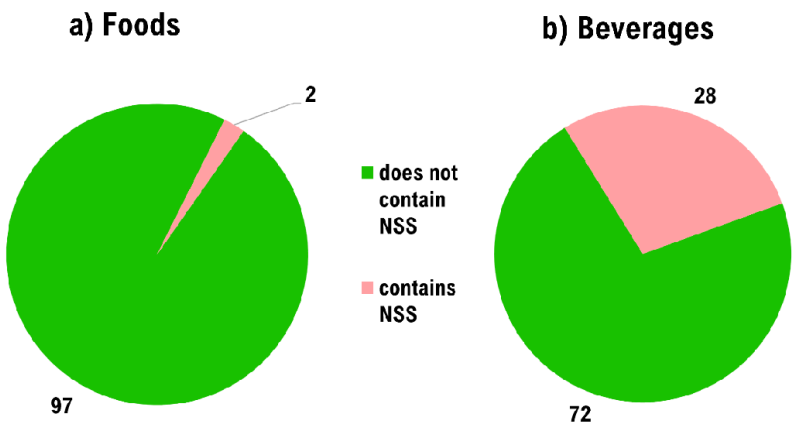


FIGURE 4: NON-SUGAR SWEETENERS (NSS) IN GHANAIAN FOOD AND BEVERAGES



Restricting non-sugar sweetener (NSS) use should be a key feature of Ghana's NPM design. As of 2023, 28% of beverages contain NSS, while a very small share of foods among records assessed in Ghana contain NSS. However, evidence from other countries that have implemented front-of-pack labeling policies without simultaneously restricting NSS use shows that such gaps can lead to increased use of non-sugar sweeteners.[18]

Table 1. Key differences between Ghana NPM and other NPMs

		Draft Ghana NPM[7,*]	WHO Afro NPM[12]	Kenya NPM[8]	SA FOPL NPM, free sugar criterion[13,†]	PAHO NPM[14]	Nutri-Score[15]
Year		2025	2019	2025	2021	2016	2023
Inclusion criteria		Applies to all packaged foods and beverages (as consumed)			Applies to all packaged food and beverages (as consumed) with free sugar, added sodium, added saturated fat, or NSS	Applies to all processed and ultra-processed foods and beverages (based on NOVA classification)	Applies to all foods and beverages (as sold) with nutrition labelling
Standardized unit of measure		Nutrient per 100g (solids) or 100ml (liquids)				Percentage energy (kCal)	Nutrient per 100g (solids) or 100ml (liquids)
Threshold Approach		Threshold per nutrient; threshold varies according to food group *(7 categories, 22 subcategories)*	Threshold per nutrient; threshold varies according to food group *(18 categories, 10 subcategories)*	Threshold per nutrient; threshold varies according to food group *(11 categories, 25 subcategories)*	Threshold per nutrient, applied without respect to food categories *(i.e. across-the-board)*		Scoring approach (A, B, C, D, E); scoring criteria varies according to category *(5 categories: red meat and products thereof; cheese; fats, oils, nuts, and seeds; beverages; general foods)*
Regulated Components	**Energy**	×	✓	×	×	×	✓
	Total fat	×	✓	✓	×	✓	×
	Saturated fat	✓	✓	✓	✓	✓	✓
	Trans-fat	✓	✓	×	×	✓	×
	Total sugar	✓	✓	✓	✓	×	✓
	Added sugar	×	✓	×	×	×	×
	Free sugar	×	×	×	×	✓	×
	Sodium	✓	✓	✓	✓	✓	✓
	NSS	✓	✓	×	✓	✓	✓
	UPF	✓	×	×	×	×	×

† The SA FOPL NPM with the free sugar criterion differs from the current NPM proposed in South Africa's Draft Regulation related to food labelling in that it treats all sugar equally, regardless of source (i.e. sucrose, fruit juice, etc.)[13]

* The Ghana NPS applies a dual thresholding strategy, integrating nutrient-specific thresholding based on WHO guidelines, and a holistic scoring system based on the Food Compass guidelines. The component applied in this analysis is the nutrient-specific thresholding based on WHO guidelines.

References

1. Kushitor SB. Food availability and food habits among Ghanaians: Tracking the dietary transition in Ghana. Nutrition and Health. 2023/03/01 2021;29(1):157-166. doi:https://doi-org.libproxy.lib.unc.edu/10.1177/02601060211066707
2. Nel JH, Steyn NP. The Nutrition Transition and the Double Burden of Malnutrition in Sub-Saharan African Countries: How Do These Countries Compare with the Recommended LANCET COMMISSION Global Diet? International Journal of Environmental Research and Public Health. 2022;19(24):16791.
3. Konkor I, Kuuire VZ. Epidemiologic transition and the double burden of disease in Ghana: What do we know at the neighborhood level? PLoS One. 2023;18(2):e0281639. doi:10.1371/journal.pone.0281639
4. World Health Organization. Noncommunicable diseases country profiles 2018. 2018:95. Ghana. September 24th, 2018. Accessed November 13th, 2025. https://www.who.int/publications/i/item/9789241514620
5. Institute for Health Metrics and Evaluation. Country Profiles: Ghana. University of Washington. November 13th, 2025. Accessed November 13th, 2025. https://www.healthdata.org/research-analysis/health-by-location/profiles/ghana
6. Ministry of Food and Agriculture and University of Ghana School of Public Health. Food-Based Dietary Guidelines. 2023:7. January 2023. Accessed November 13th, 2025. https://mofa.gov.gh/site/images/pdf/Ghana_Food_Based_Dietary_Guidelines_2023.pdf
7. Ministry of Health, Food and Drugs Authority. The Ghana Double-Duty Nutrient Profiling System (NPS) 2025.
8. Ministry of Health. Kenya Nutrient Profile Model. State Department for Public Health and Professional Standards/Division of Nutrition and Dietetics; 2025. Accessed August 25th, 2025.
9. Resolve to Save Lives. Policy and Legal Landscape Analysis for Front-of-Pack Labeling and Salt Target Setting in Nigeria. 2023. https://avehealthsense.com/wp-content/uploads/2024/10/Policy-and-Legal-Analysis-FOPL-and-Salt-Target-Nigeria_CB_REVISED.pdf
10. United Republic of Tanzania Prime Minister's Office. National Multisectoral Nutrition Action Plan. 2021. Accessed August 7th, 2025. https://www.pmo.go.tz/uploads/documents/sw-1646121553-NMNAP.pdf
11. Department of Health. Regulations relating to the labelling and advertising of foodstuffs (Draft). R 3337. Pretoria, South Africa. 2023.
12. World Health Organization. Nutrient Profile Model for the WHO African Region: a tool for implementing WHO recommendations on the marketing of foods and non-alcoholic beverages to children. 2018. Accessed August 25th, 2025. https://www.who.int/publications/i/item/9789290234401
13. Frank T, Thow A-M, Ng SW, Ostrowski J, Bopape M, Swart EC. A Fit-for-Purpose Nutrient Profiling Model to Underpin Food and Nutrition Policies in South Africa. Nutrients. 2021;13(8):2584.
14. Pan American Health Organization. Pan American Health Organization Nutrient Profile Model. 2016. https://iris.paho.org/handle/10665.2/18621
15. Sante publique France. Nutri-Score. Updated March 20th, 2025. Accessed August 25th, 2025. https://www.santepubliquefrance.fr/en/nutri-score
16. Global Health Advocacy Incubator. Nutrient Profile Models: A Valuable Tool for Developing Healthy Food Policies. 2024:5. Accessed November 17th, 2025. https://assets.advocacyincubator.org/uploads/2024/NPM_Position_Paper.pdf
17. Dubois P, Albuquerque P, Allais O, et al. Effects of front-of-pack labels on the nutritional quality of supermarket food purchases: evidence from a large-scale randomized controlled trial. Journal of the Academy of Marketing Science. 2021/01/01 2021;49(1):119-138. doi:10.1007/s11747-020-00723-5
18. Zancheta Ricardo C, Corvalán C, Smith Taillie L, Quitral V, Reyes M. Changes in the Use of Non-nutritive Sweeteners in the Chilean Food and Beverage Supply After the Implementation of the Food Labeling and Advertising Law. Front Nutr. 2021;8:773450. doi:10.3389/fnut.2021.773450

THE GHANA DOUBLE-DUTY NUTRIENT PROFILING SYSTEM